WIRE AND WIRE PRODUCTS

MAY 1961

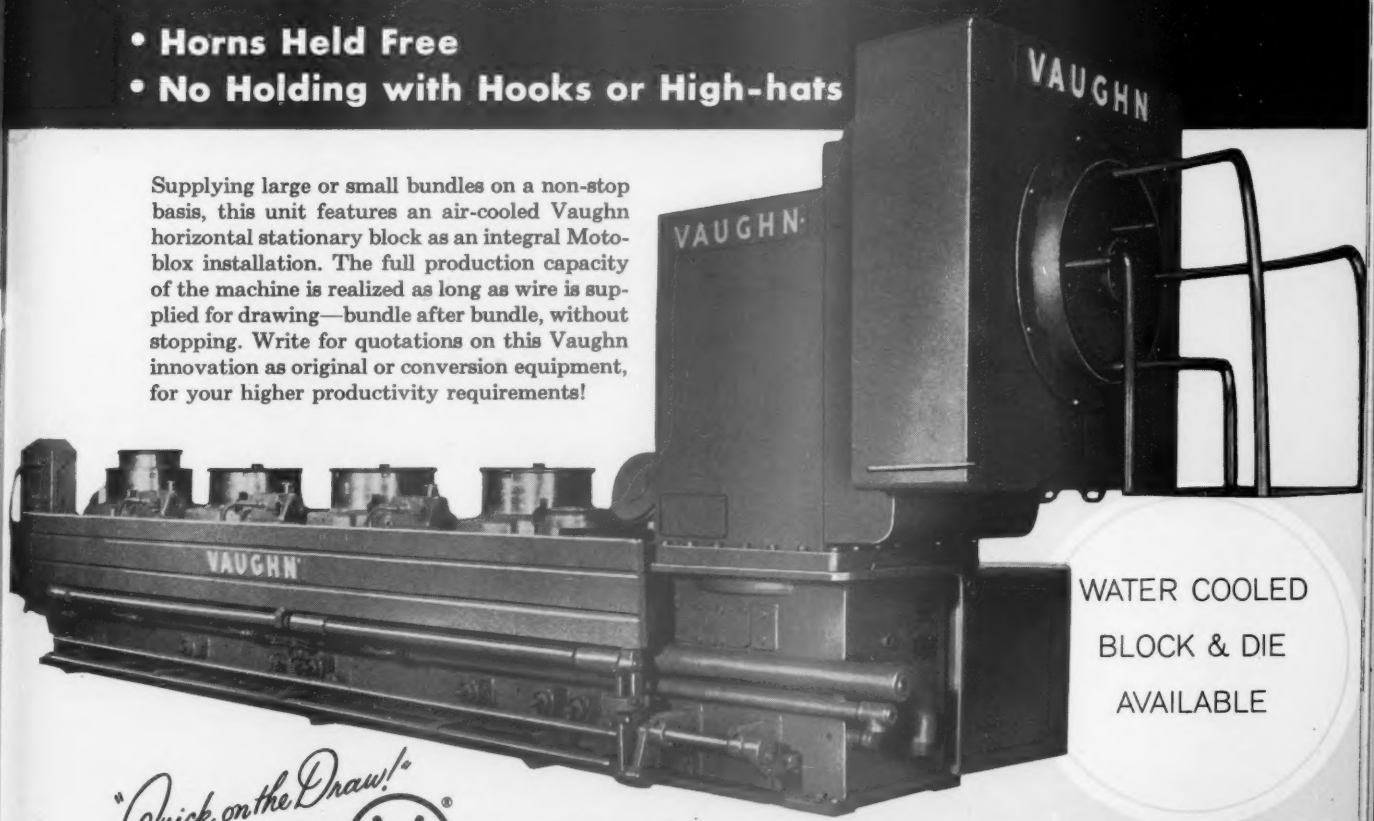
Horizontal Stationary Finishing Block on

The Vaughn® Motoblox®

BACK-GEARED—FOR AUTOMATION *NOW!*

- **Horns Held Free**
- **No Holding with Hooks or High-hats**

Supplying large or small bundles on a non-stop basis, this unit features an air-cooled Vaughn horizontal stationary block as an integral Motoblox installation. The full production capacity of the machine is realized as long as wire is supplied for drawing—bundle after bundle, without stopping. Write for quotations on this Vaughn innovation as original or conversion equipment, for your higher productivity requirements!



WATER COOLED BLOCK & DIE AVAILABLE

"Quick on the Draw!"

The Vaughn® Machinery Company

Cuyahoga Falls, Ohio, U.S.A.

COMPLETE COLD DRAWING EQUIPMENT—Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

COULTER & McKENZIE

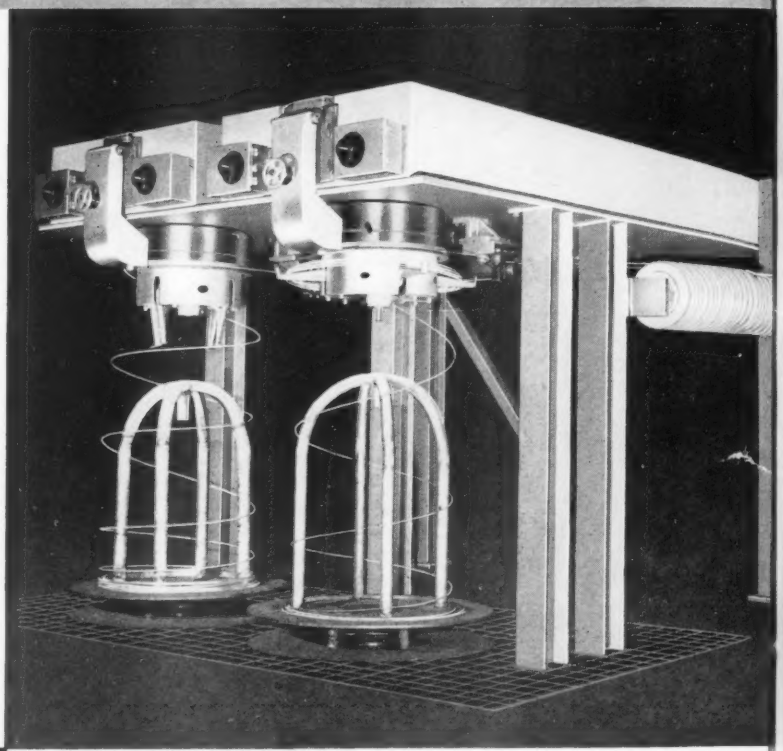
ANNOUNCES THE WIRE INDUSTRY'S MOST VERSATILE TAKE-UP & WIRE PACKAGING MACHINE!

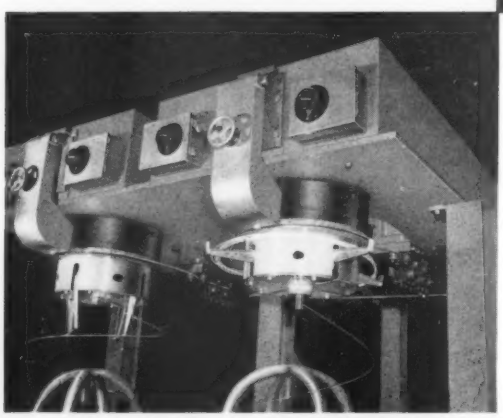
Vari-Coil

For PATENTING
ANNEALING
GALVANIZING
ENAMELING
TINNING
FINAL DRAW

- √ Non-Stop Package Changing
- √ Package Sizes to 4,000 lbs.
- √ Coil Diameters to 36″
- √ Speeds Infinitely Variable
- √ Wire Size to ⅜″ (.375″)
- √ Ferrous and Non-Ferrous Materials Including High Carbon Steel

THERE IS A SIZE FOR ALL APPLICATIONS. SINGLE OR MULTIPLE UNITS FOR YOUR INDIVIDUAL JOB.





For information concerning your application, please write or telephone.

1 INFINITELY VARIABLE RANGE OF COIL SIZES
a. All sizes wire from same capstan.
b. Current models with coil ranges 16″ to 26″ and 24″ to 36″ without changing blocks.
c. Coil sizes may be altered without stopping.

2 GREATER COIL WEIGHTS
a. Turn tables accommodate coils, drum paks and stems (200 to 1200 lbs.)
b. Oversize loads on handling pallets (1000 to 4000 lbs.)

3 INCREASED RANGE OF WIRE AND ROD SIZES
a. Precise cast control of fine wire to coarse rod.
b. No axial twist.

4 ACCUMULATOR HEAD PROVIDES INTERVAL FOR STRIPPING AT OPERATOR'S CONVENIENCE
a. Accumulator operating in conjunction with main take-up block is key to uninterrupted constant speed take-up.
b. Operator has 5 to 10 minutes accumulation time for stripping finished package from turn table.

This equipment manufactured under one of the following U. S. Patents 2,732,060; 2,868,474; 2,844,416; 2,868,268 or others pending.

Barron & Crowther Ltd., Eastleigh, Hants, England. European Draw-Pak Licensee Idos Industries Ltd., Royston, Herts, England, Sales Agents.

35 UNION AVENUE

TELEPHONE EDISON 5-1101
LIEBER'S CODE "MACKENZIE"

THE COULTER & McKENZIE MACHINE CO., INC.

SINCE 1942 BRIDGEPORT 7, CONNECTICUT, U. S. A.

Another 1st from Standard

Color Identification ... of Wire Drawing Lubricants offers the following Unique Advantages.

1 SUPERVISORS HAVE ABSOLUTE CONTROL OVER LUBRICANT JOB APPLICATIONS.

2 **MACHINE OPERATORS QUICKLY SELECT THE CORRECT LUBRICANT BY COLOR.**

3 **WIRE REJECTS, ATTRIBUTABLE TO THE USE OF INCORRECT LUBRICANTS, ARE ELIMINATED.**

4 COLOR IDENTIFICATION SAVES DOLLARS AND TIME EVERYWHERE.

"Look to STANDARD for the Future"

Standard Industrial has pioneered in most of the outstanding contributions to better wire drawing through better lubricants. Consult Standard Industrial for the solution of your difficult problems.

SERVICE ★ INTEGRITY ★ DEPENDABILITY

STANDARD INDUSTRIAL

COMPOUNDS CO., INC.

Member WAS

Frankfort Illinois (A suburban Chicago area city)

Telephones: 2131 - 2141

European Manufacturer: Revalorizacion de Grasa y Acietes, S.A. Gran Via No. 4, Bilboa, Spain.

Canadian Manufacturer: H. L. Blachford Ltd., 977 Aqueduct St., Montreal, Que.
H. L. Blachford Ltd., 40 Titan Rd., Toronto, Ont.

Improved

SHAFTLESS TAKE-UP

General Specifications

Both side frames move in or out simultaneously, keeping center of reel traverse always in line with delivery point of cable, thus equalizing and minimizing cable deflection.

Reel gear and drive pinion remain in engagement at all times.

Quick traverse reversing by air valve.

Motor driven screw width adjustment.

Motor driven screw reel lift.

Traverse adjustable for reel width and cable diameter, while machine is running.

Traverse speed adjustable over range of cable diameters in increments of 1/20.

Drive can be supplied to suit customer's requirements.

Mechanical slip clutch friction drive for the capstan.

Variable speed motor drive with manual control.

Variable speed motor drive with automatic electrical control.

Available in the following sizes:

36" dia. reel to 52" dia. max.
36" dia. reel to 72" dia. max.
36" dia. reel to 84" dia. max.
42" dia. reel to 96" dia. max.

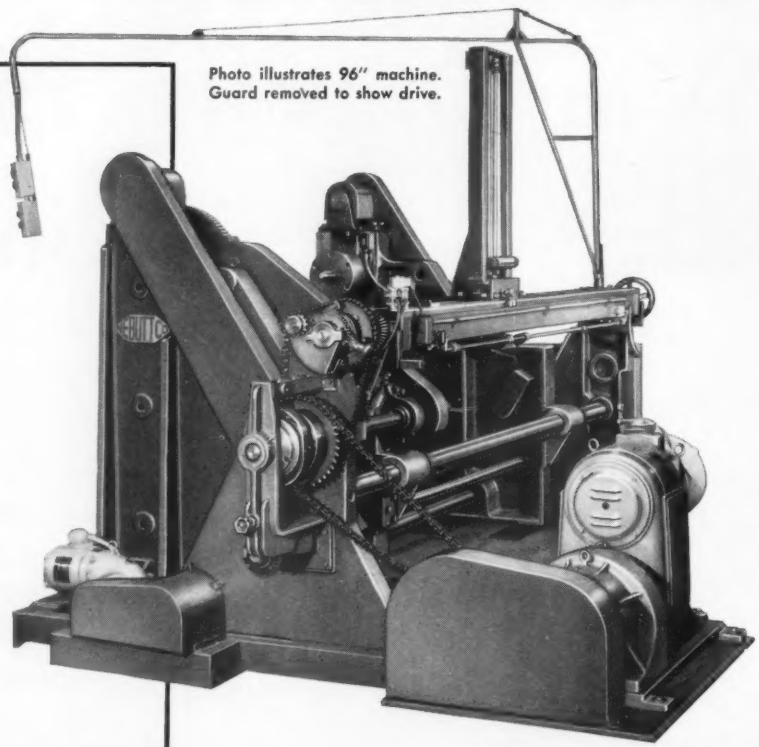
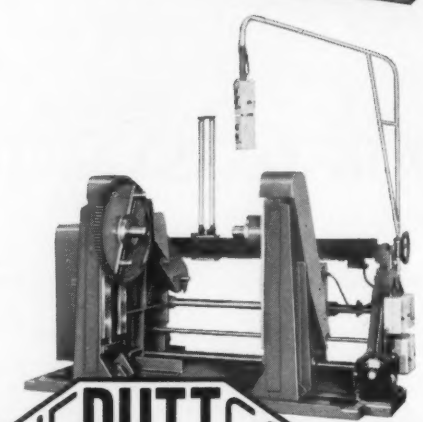


Photo illustrates 96" machine. Guard removed to show drive.

This heavy duty Take-Up includes latest developments which further increase ability to produce high quality cables. Many of these machines, in the previous model, are in continuous, trouble-free operation in plants throughout the country. It handles bare or insulated cables of all weights and sizes at a wide range of speeds . . . is readily controlled by the operator by means of the convenient swinging pendant push button station. Various drives can be provided and the machine readily adapted by our engineers to meet your special requirements. Write us for further information and details.



NEW ENGLAND BUTT CO.

DIVISION WANSKUCK COMPANY

304 Pearl Street · Providence 7, R. I.

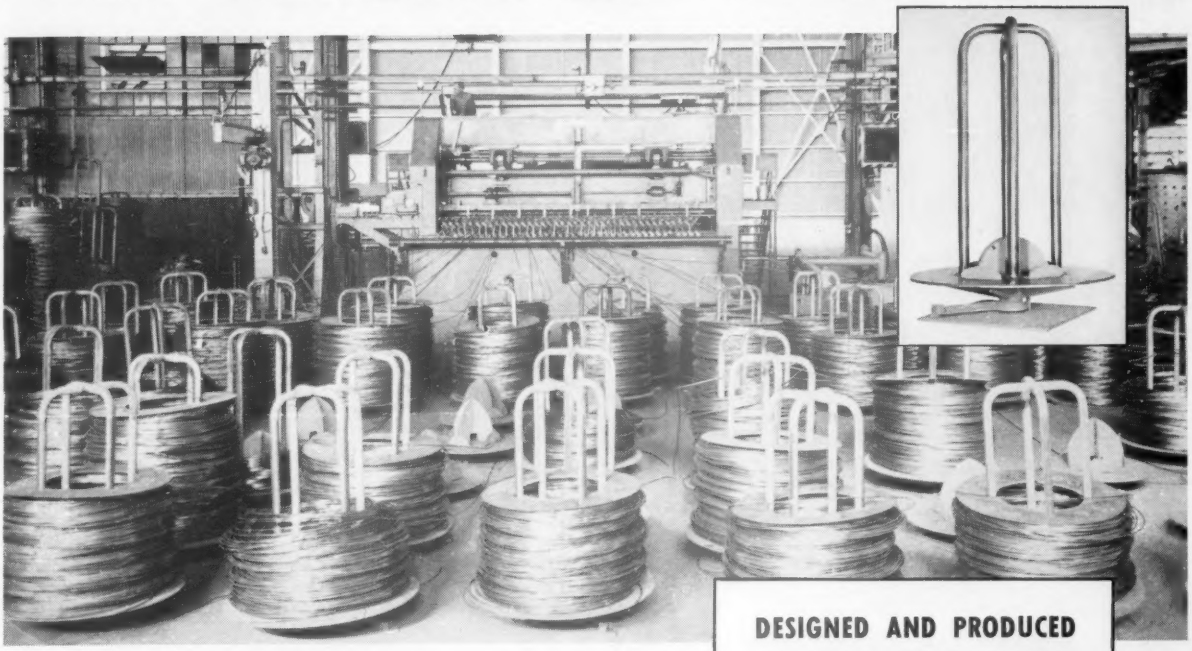
In England — James Day (Machinery) Ltd., 28 Maddox Street, London, W-1.

NEBUTTCO

Braiders **Bunchers**
Cablers **Stranders**
Take-ups **Taping Machines**

WORKING WONDERS WITH WIRE: **UP** goes production efficiency, **DOWN** go losses at Detroit Steel Corporation

...thanks to Northern Indiana Steel's high capacity, heavy-duty WIRE CARRIERS and PAY-OFF REELS



WIRE DRAWING—DETROIT STEEL STYLE

Behind-the-scenes at the recently-installed welded wire fabric machine, which draws wire for the widely-known LPR Coils at Detroit Steel Corporation's Portsmouth, Ohio Plant. You see the entry side of the giant machine, with Northern Indiana Steel Wire Carriers and Pay-Off Reels in use for both feeding and storaging wire to the unit. In this way interruption is reduced to a minimum.

"MAKES LONG PRODUCTION RUNS POSSIBLE,"

says Detroit Steel's Rod and Wire Division head:

Reports Superintendent U. V. Johnson, "The introduction of these wire carriers and pay-off reels as part of our handling equipment has greatly improved the efficiency of our wire drawing and welded fabric operations. It makes long production runs possible in wire-making and wire-users plants."

DESIGNED AND PRODUCED TO YOUR SPECIFICATIONS

Wire Carriers and Reels that

- ✓ **FEED MORE SMOOTHLY**
- ✓ **CARRY UP TO 4,000 LBS.**
- ✓ **STACK AND STORE EASILY**

Let us know exactly what your operating needs require. If we don't already have it in stock, we're ready to make up your order as per your specifications. In any case, we'll be pleased to quote you promptly in quantities specified.

Northern Indiana Steel Supply Co., Inc.

Fabricating Division, Michigan City, Indiana

TELEPHONE TRiangle 4-3241

WIRE PREHEATERS

FOR FINE AND HEAVY GAUGE WIRES

by FEDERAL

SPECIAL DESIGN UPON REQUEST

Models PH 5
PH 10
PH 15
PH 15
PH 20
PH 30

- Variable Heat Control
- Ammeter—Voltmeter
- Disconnect Switch
- Low Torque on Wheels
- Automatic Power On-Off
- Isolated Circuit
- 2 Triple Grove Contact Wheels
- Adjustable to Wire Line

Other FEDERAL Products

PAYOFFS • TAKE UPS • CAPSTANS • RESPOOLERS, 2-3 WHEEL MEASURING MACHINES • PAYOFF PAKS • COLLAPSIBLE COILING REELS • COILING MACHINES • PLANETARY CABLERS • WIRE PREHEATERS

TEST EQUIPMENT

SPARK TESTERS • HI POTENTIAL TESTERS • AC DC ELECTRONIC

THE FEDERAL MANUFACTURING CO. WALLINGFORD, CONN.
WIRE MACHINERY • TESTING EQUIPMENT

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PLASTICS & EQUIPMENT SALES
8232 Major Avenue, Morton Grove, Ill.

Canada
E. V. LARSON, LTD.
Toronto, Canada

WIRE AND WIRE PRODUCTS*

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 36 May, 1961 No. 5

Designated as Official Publication By The Wire Association

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ACHIEVE ALACRITY

For those small spring wires too tough for pliers, try our #4 TODD cutter.

A really "quality" tool at pliers price!

Replaceable jaws? Naturally!

STOCKED BY MOST MILL SUPPLY DEALERS

made by

M. W. ROBINSON CO., INC.

ROCKFALL, CONN., U.S.A.

Please feel free to consult us with your wire cutting problems.

Quality plus economy when you buy SUMITOMO steel wire rods

Rapid developments in the wire-product field have increased industry's demand for top-quality steel wire rods. Because of its international reputation for reliability, Sumitomo Metal supplies world markets — America in particular — with 7,000 tons of wire rods every month. To keep up with this export demand, Sumitomo Metal has added to its present facilities another new wire rod mill, completely equipped with the most modern machinery available.

Dimensions of Sumitomo Wire Rods

Diameter 5mm. (13/64″) — 16mm. (5/8″)
Weight Single Bundle
about 270 kgs. — 320 kgs.
600 lbs. — 700 lbs.
Compressed Bundle (6 coils)
about 1,620 kgs. — 1,920 kgs.
3,600 lbs. — 4,200 lbs.
Coil Dimensions on Request

LEADING PRODUCERS OF STEEL WIRE RODS, PIPE AND ROLLING STOCK PARTS

SUMITOMO METAL INDUSTRIES, LTD.

Head Office: Osaka, Japan
Cable Address: "SUMITOMOMETAL OSAKA"

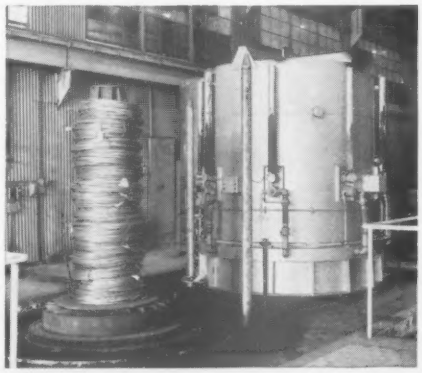
New York Office: 420 Lexington Ave., New York 17, N.Y.
Cable Address: "SUMITMETAL NEWYORK"

a pictorial report

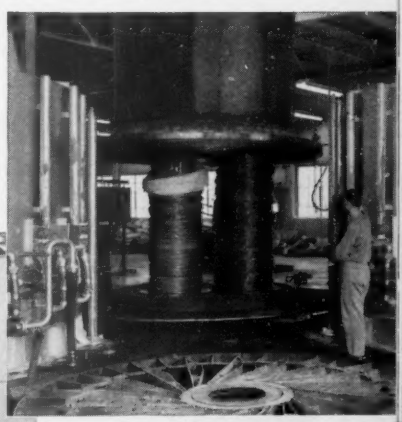
modern production advances in rod and wire processing

EXTRA LARGE CHARGES can be handled in the new Lee Wilson furnaces. With a charge diameter of 114" and a piling height of 108" it is now possible to anneal four large spindles of rod in a single charge.

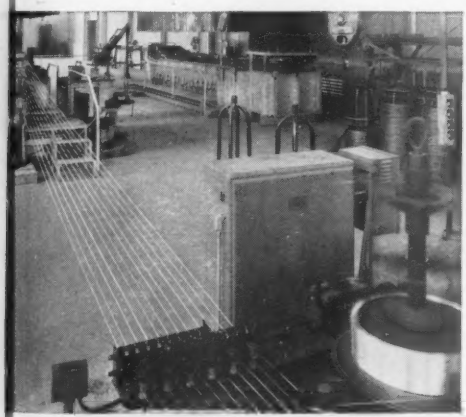
SPEED and FLEXIBILITY are achieved at American Steel and Wire Division of U.S. Steel Corp. through a complete department of large high convection furnaces.



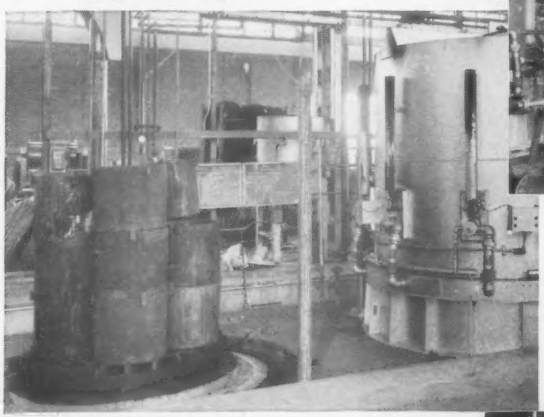
STAINLESS STEEL ROD AND WIRE ANNEALING is performed best in Lee Wilson Bell Type Furnaces. Big producers, like Jones & Laughlin, find they get exacting uniformity of both analysis and structures, charge after charge.



COIL SPHEROIDIZING is performed most efficiently in Lee Wilson Bell Type High Convection furnaces. Lamson & Sessions' Cleveland, O., installation is typical of the spheroidizing operation found in fastener producing plants.



GALVANIZING methods have undergone vast improvement in the past decade. Many leading wire producers, like The Gilbert & Bennet Manufacturing Company, have recently changed to Lee Wilson radiant tube heated lines.



SLUG SPHEROIDIZING furnaces were developed by Lee Wilson for cold extrusion work for the Braun Engineering Co. of Detroit, where uniformity of hardness is an absolute necessity.

Leading rod and wire mills and product producers have, for more than 25 years, come to rely on Lee Wilson Engineering Co., Inc., for the latest developments in rod and wire annealing, spheroidizing, heat treating, galvanizing and handling equipment. This report on the industry's most advanced methods shows you some of the reasons why.

Literature available on all phases of modern wire annealing, heat treating, galvanizing and handling. To get your copies contact your Lee Wilson sales engineer or write direct to *Lee Wilson Engineering Company, Inc., 20005 Lake Rd., Cleveland 16, O.*

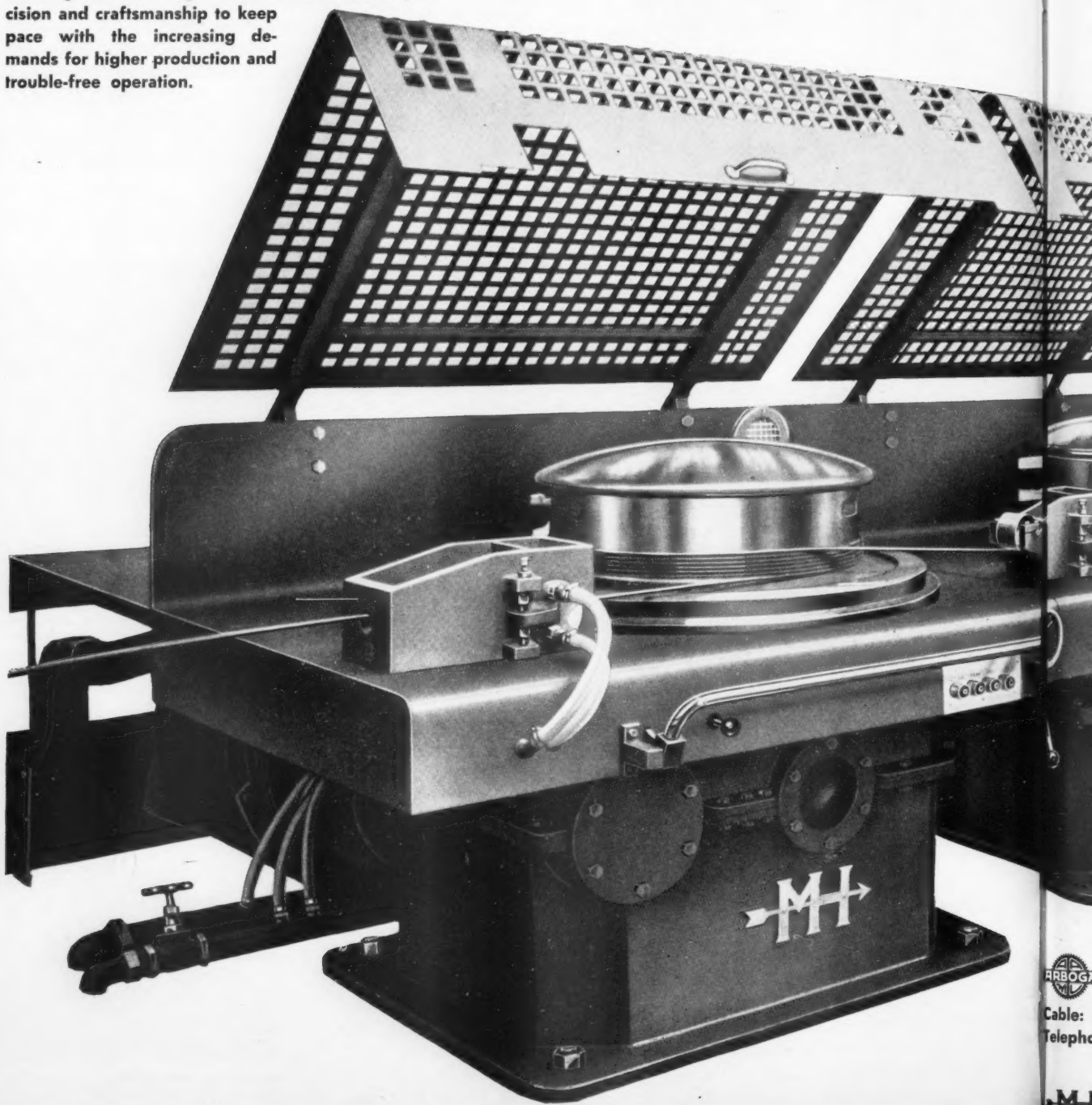
Lee Wilson

HEAVY OIL TEMPERING is now possible at faste speeds and closer camber tolerances since Le Wilson engineers developed their high speed equip ment.

ARBOGA

THE BEELINE

Founded in 1856, AB Arboga Mekaniska Verstad — since 1943 a subsidiary of Morgardshammar — has for more than 60 years been designing and building wire drawing machines with Swedish precision and craftsmanship to keep pace with the increasing demands for higher production and trouble-free operation.



ARBOGA

Cable:

Telepho

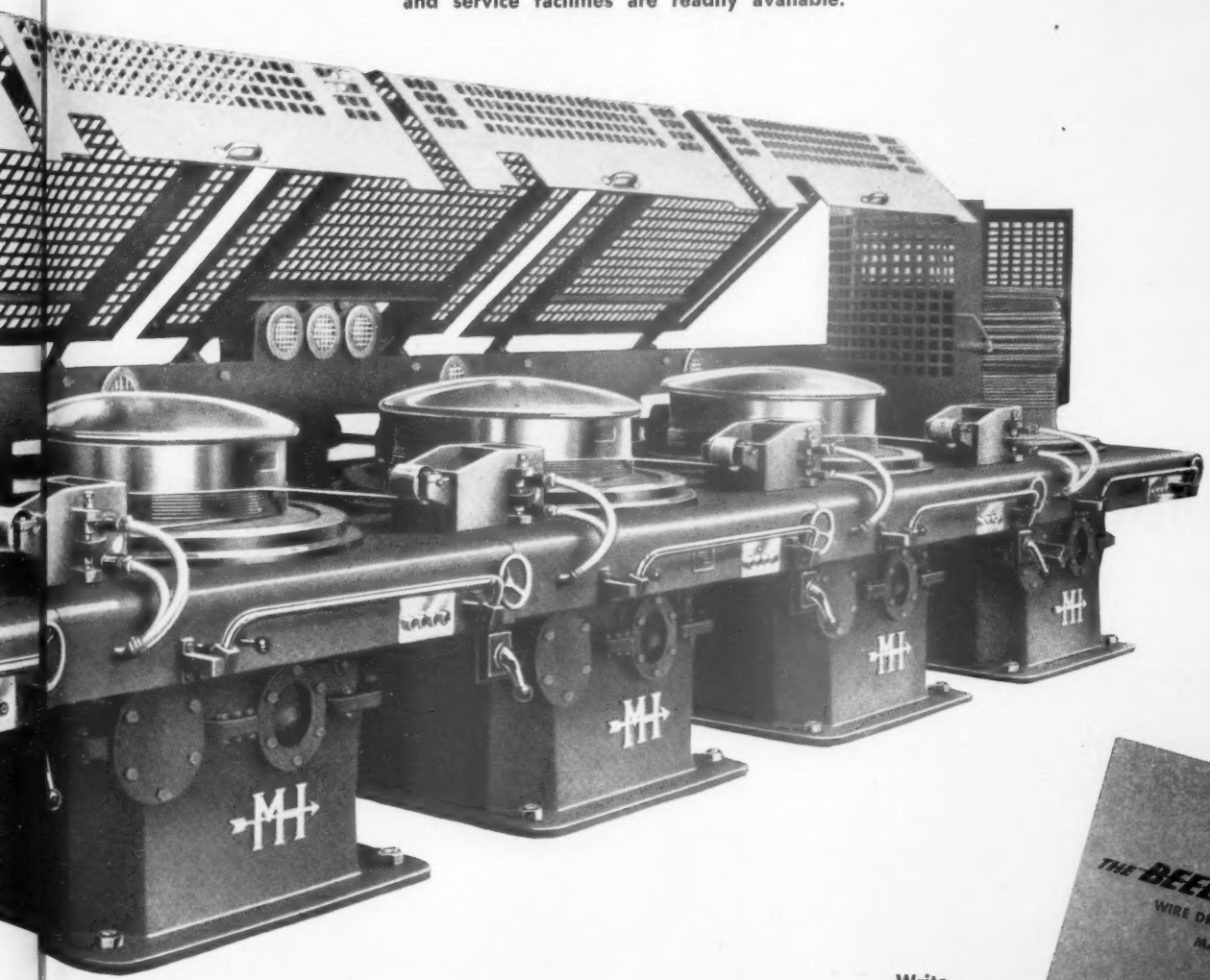
WIRE DRAWING MACHINES

WORLD WIDE

PRECISION WITH RUGGEDNESS

This BEELINE DG-5 — designed for manufacturing wire used in pre-stressed concrete fabrication — is a heavy-duty, straight-line, non-slip wire drawing machine that delivers high speed production with minimum maintenance.

It is delivered as a complete machine, job-tested and ready to go into operation with a minimum of labor and installation expense. Complete engineering and service facilities are readily available.



Write for your copy.

AB ARBOGA MEK. VERSTAD
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Telephone: 0589/12720

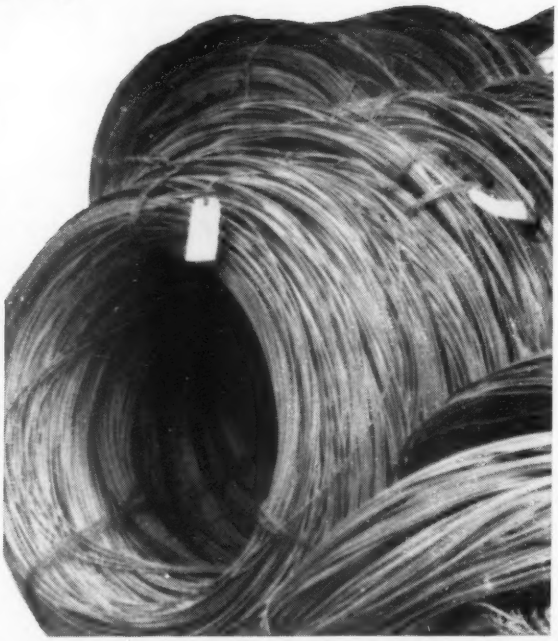
Subsidiary of
MH MORGÅRDSHAMMAR

U.S. OFFICE MH. MACHINES
19002 LOMOND BLVD.
CLEVELAND 22, OHIO
TELEPHONE:

Operation: Descaling

(One of a series)

Drawn and annealed wire descaled
up to 800 feet per minute



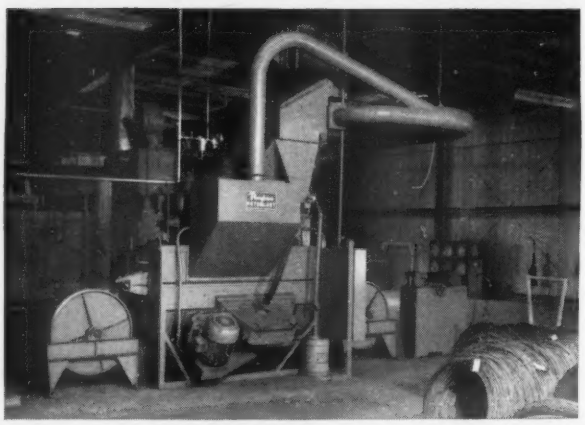
Hot rolled rod descaled
at 200-600 feet per minute

These figures speak for themselves!

Compare these speeds with your own descaling performance. Then consider this: fast descaling time is only one of many reasons why Pangborn Rotoblast cuts your costs.

Here are some other specifics: Rotoblast eliminates loss of virgin metal . . . ends acid disposal problems . . . requires less space . . . reduces original investment by as much as 70% over pickling equipment. Rotoblast descaling equipment goes to work at the touch of a button. Because it is a dry process, it is absolutely non-toxic, an important aid to employee morale. Rotoblasting gives an improved surface for application of lubricant.

You save money other ways, too. You can maintain Rotoblast more easily. Because Rotoblast Cabinets are fully lined with wear plates, you never have to replace the cabinets themselves. All three wheels of the Rotoblast units assembly are fully exposed and easily accessible—not locked up inside the equipment. Overall result: lower operating costs, lower maintenance costs.



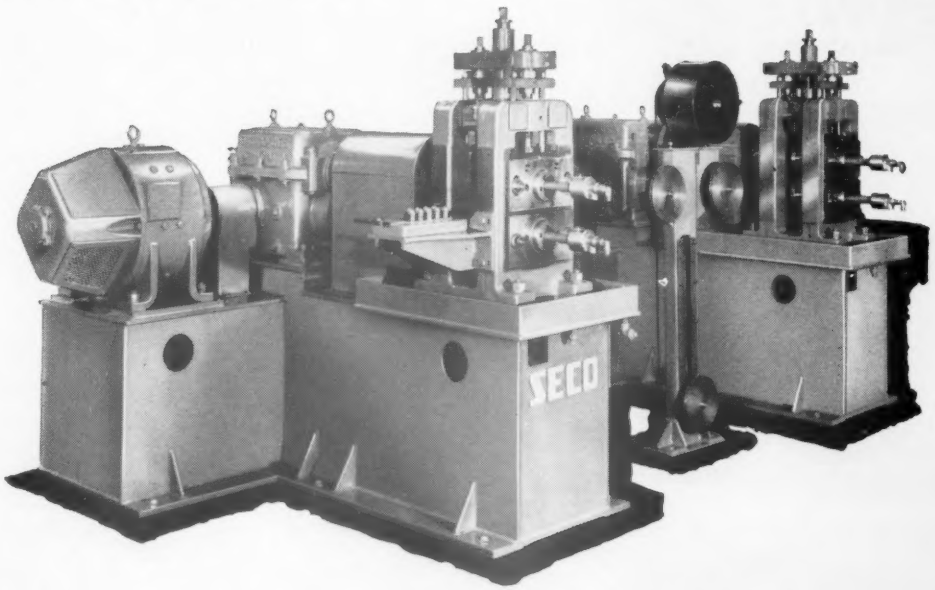
Pangborn
OF HAGERSTOWN

For more detailed information, write: PANGBORN CORPORATION, 5400 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada, Ltd., 47 Shaft Rd., Toronto (Rexdale), Canada—*Manufacturers of Blast Cleaning, Vibratory Finishing, Dust Control Equipment; Rotoblast® Steel Shot and Grit©.*

Predictable Performance

is yours when you change to

SECO WIRE FLATTENING MILLS



• Acceptable and predictable performance "on both sides of the fence" when Seco Wire Flattening Mills are used in your operation.

Seco's staff of trained engineers . . . specialists in solving production problems . . . are available for personal assistance to you. Call us today.

SECO

SECO STEEL MILL EQUIPMENT

- Leveling and Shearing Lines
- Combination Edging and Flattening Lines
- Tension Reels for Strip Polishers
- Narrow Strip Grinding Machines
- Multiple Strand Pull-out Rolls and Take-up Frames
- Strip Coilers (Up and Down Type)
- Traverse Reels for Narrow Strip
- Steel Coil Up-enders
- Scrap Ballers

STEEL EQUIPMENT COMPANY

P. O. BOX 737, WARRENSVILLE STATION • CLEVELAND 22, OHIO

AFFILIATED WITH *Lee Wilson* ENGINEERING CO., INC.

YAWATA STEEL, YAWATA STEEL

ACROSS THE SEAS TO WORLD MARKETS

Wire Rods of extremely high quality are produced by YAWATA for satisfied users throughout the world.

YAWATA, the biggest IRON and STEEL operation in the Far East, has the equipment and the knowhow to produce STEEL products of high quality and dependability.

When buying steel from JAPAN, specify YAWATA.

YAWATA IRON & STEEL CO., LTD.

Head Office: No. 1, 1-chome, Marunouchi, Chiyoda-ku, Tokyo, Japan
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Tel: 1-0463 Cable Address: YAWATASTEEL DUESSELDORF

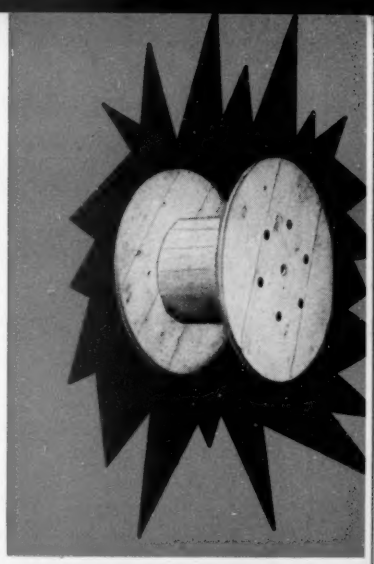
American Office: Room 2009, Seagram Building., 375 Park Ave., New York, 22, N.Y., U.S.A. Tel: Murray Hill 8-3327
Cable Address: YAWATAISCO NEWYORK

Saw mill at Bradford, N. H., where logs are processed into lumber.

HOW BRIDGE SUPPLIES ONLY THE BEST REELS

Our company is progressive. Since we began the manufacture of wood reels our plant has undergone continued expansion and improvement in production facilities.

In recent years modern affiliated companies have been established in New Hampshire to further enable us to better serve the growing needs of the wire industry.



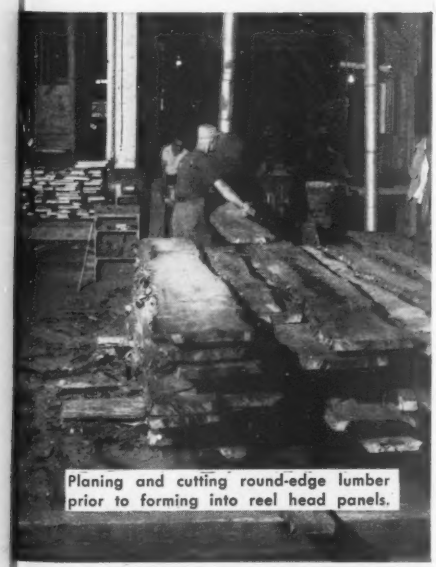
NON-RETURNABLE

WOOD REELS IN ALL SIZES FOR ALL TYPES OF ELECTRIC WIRE AND CABLE

- Controlled saw mill work
- Air seasoning of lumber
- Conversion of stock into panels and square-edge lumber
- Maintenance of millions of board feet of lumber in inventory
- Efficient, modern material handling methods and equipment

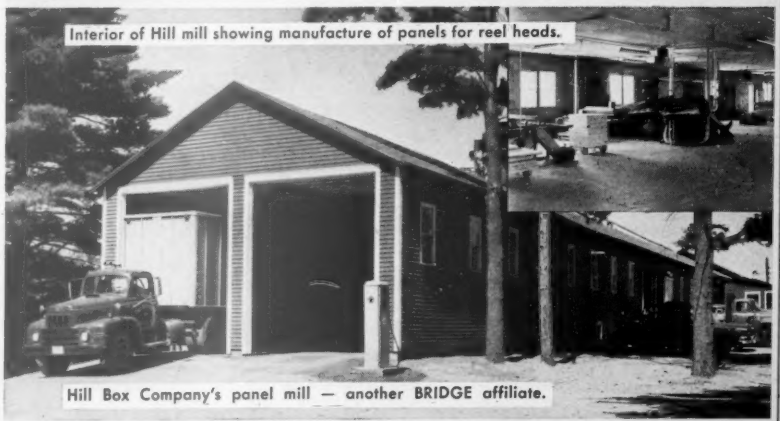
Interior of the Kearsarge plant.

Plant of Kearsarge Reel Co. — an affiliate of Bridge Manufacturing Co.



Planing and cutting round-edge lumber prior to forming into reel head panels.

NON-RETURNABLE REELS GIVE YOU A DEFINITE PACKAGING COST



Interior of Hill mill showing manufacture of panels for reel heads.

Hill Box Company's panel mill — another BRIDGE affiliate.

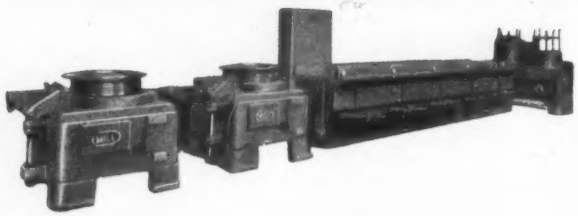
"REEL" GOOD —

Let us quote on your Reel needs. Send in your specifications. Better yet, visit our plant and see how Reels are made so well at so low a cost.

WOOD REELS

HIGH-SPEED SHIPPING SERVICE IN OUR OWN TRUCKS WITHIN A RADIUS OF 250 MILES OF THE PLANT, FAST FREIGHT WILL BRING YOU BRIDGE

TEL: THOMPSONVILLE, CONN.

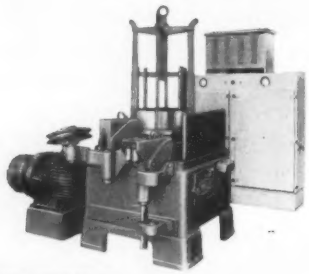


MULTIPLE STRAIGHT-LINE WIRE DRAWING MACHINE, Type MV 25, max. inlet dia. 8 mm. (hard steel), 12 mm. (mild steel), 14 mm. (copper wire).

MILL

MILL

MILL

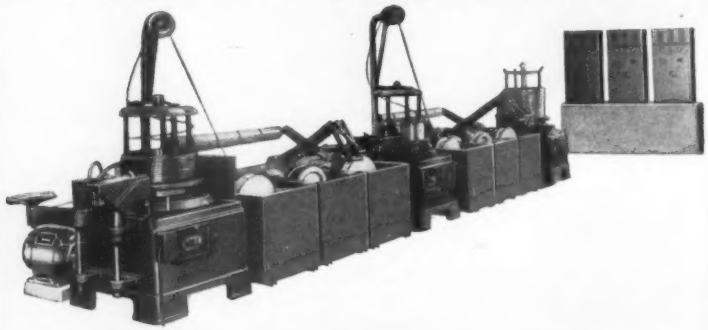


WIRE DRAWING BLOCK, Type TV 25/2, max. inlet dia. 6.5 mm. (hard steel), 8 mm. (mild steel), 12.7 mm. (copper wire).

NOVELTY

MILL

CONTINUOUS WIRE DRAWING AND COPPER COATING EQUIPMENT, suitable for drawing and copper coating hard and mild steel wires for bright copper coated wire.



SPOOLER, Type RM 15/1

The Societa Generale delle Macchine "Mill" announces the availability of the following equipment:

Single or double deck Bull Blocks • Multiple Pass Straight Line Wire Drawing Machines • Submerged System Wire Drawing Machines • Continuous Wire Drawing and Copper Coating Plant • Dual Reel Take-ups • Rotating Die Holders • Constant Tension Spoolers • Single Coilers • Multiple Coilers • Mechanical Descaler • Roller Pointing Machines • Rod Flippers • Electrical Winch • Rotating Flippers • Pull-in Dogs • Deburring Pliers.

GENERAL CATALOGUE ON APPLICATION.

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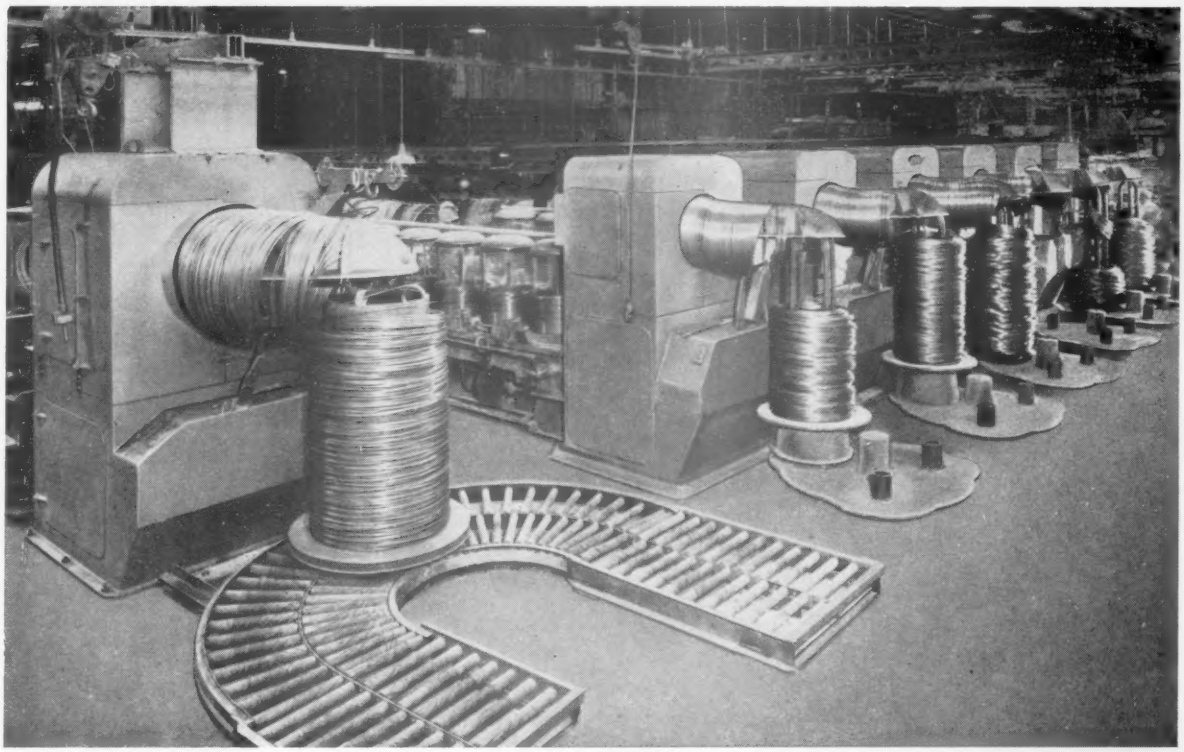

A portion of Whitacre Wire Drawing Dead Block installations at Sheffield Division of Armco Steel Corp. at Kansas City

FACTS SPEAK LOUDER THAN CLAIMS!

In actual operation Whitacre Wire Drawing Dead Blocks have delivered . . .

40%

Increase in Production

39%

Decrease in Costs!

Let us prove this statement. Investigate today!

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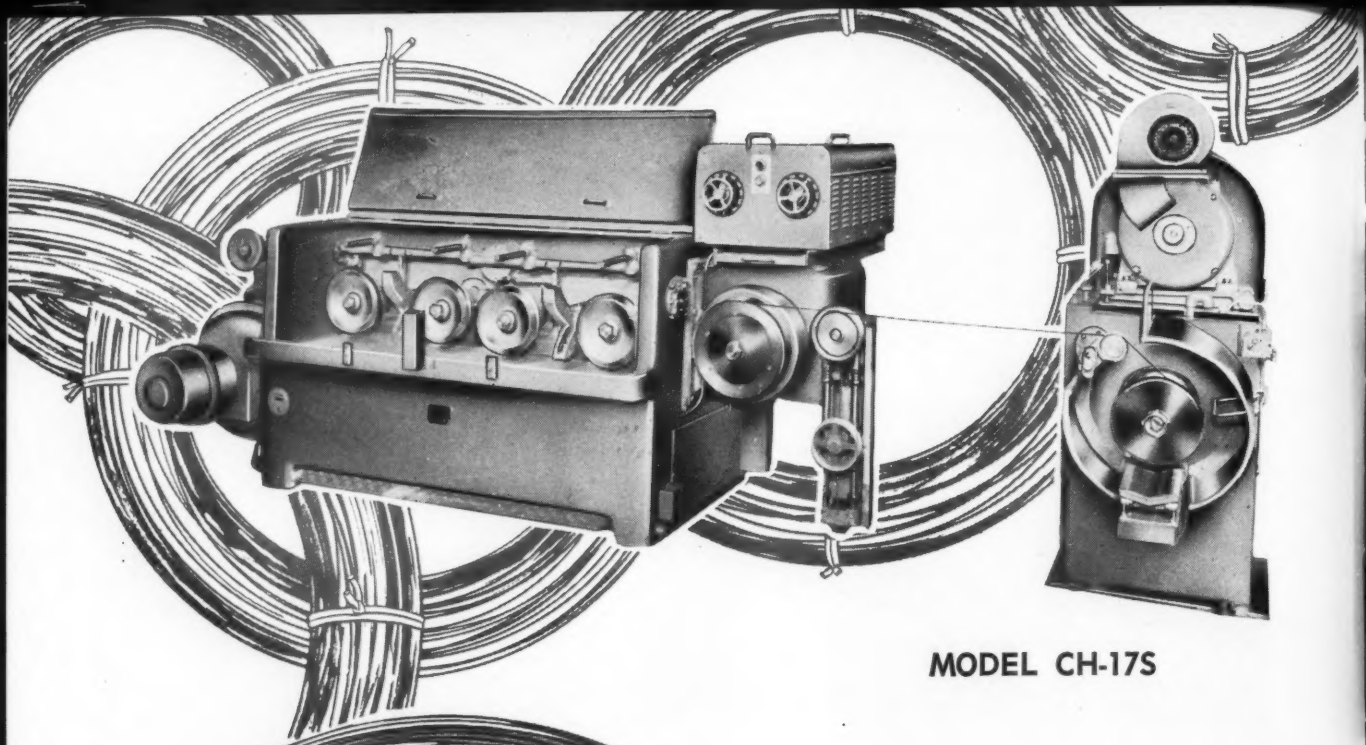


MODEL CH-17S

WIRE DRAWING MACHINE FOR COARSE FINE WIRE

SPECIFICATION:

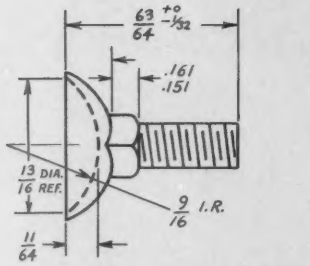
Entry diam.	2.3 mm
Finished diam.	0.65 mm to 0.32 mm
Number of dies	17
Finishing speed	1300 m/min.
Power required	50 HP

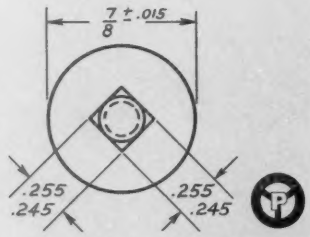
SHOWA MACHINE WORKS LTD.

No.16, Naka 3-chome, Mitezima, Nishi-Yodogawaku, OSAKA, JAPAN.

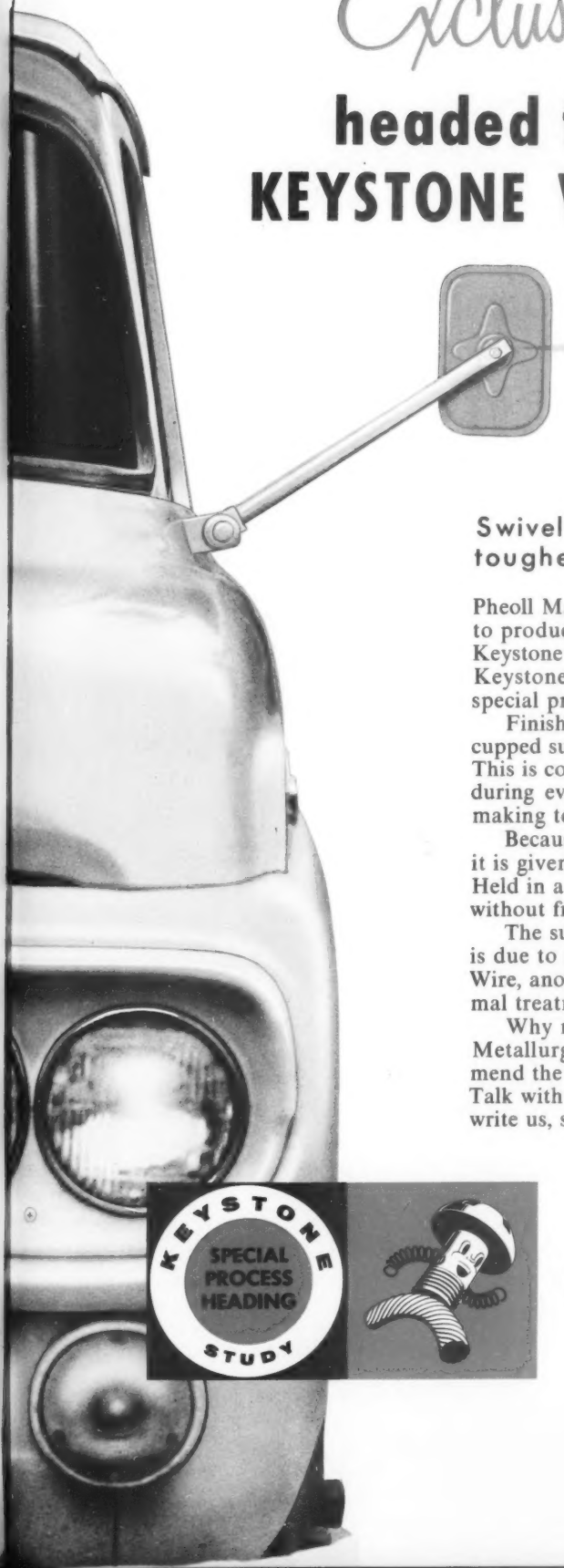
SHOWA

Exclusively headed from KEYSTONE WIRE





Pheoll Manufacturing Company, Inc.



Swivel base for truck rear view mirror passes toughest tests before it hits the road!

Pheoll Manufacturing Company, Inc., Chicago, Illinois, assigned to produce the square-shouldered cup screw shown here, asked Keystone Steel & Wire Company for the exact cold heading wire. Keystone's Metallurgists developed double extrusion coated special processed quality wire.

Finished product specifications called for a uniformly smooth cupped surface, free of burrs for proper adjustment of the mirror. This is consistently achieved by Keystone Wire's quality control during every step of wire manufacture from open hearth steel making to finished wire.

Because this cup screw must withstand the rigors of the road, it is given the toughest tests to check head stress and ductility. Held in a vise, the shank is struck repeatedly until it is bent 90° without fracture. The cup portion gets similar treatment.

The success of this cold-headed square shouldered cup screw is due to the superior *flowability* of Keystone Special Processed Wire, another example of proper chemical analysis, correct thermal treatment and consistent uniformity throughout every coil.

Why not take advantage of the service offered by Keystone Metallurgists who will analyze your specifications and recommend the wire just right to solve your particular wire problems? Talk with your Keystone Representative for complete details, or write us, sending your part and blue prints, if possible.

Keystone Steel & Wire Company, Peoria, Illinois

KEYSTONE

WIRE FOR INDUSTRY

MANUFACTURED AT PEORIA, ILLINOIS, U. S. A.

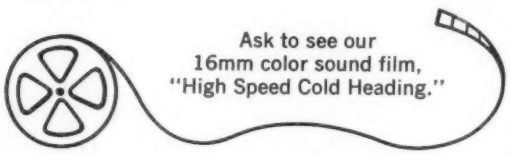
450* PIECES PER MINUTE!

NOT JUST SPEED ALONE ... BUT SPEED PLUS ...

accuracy of product, rigidity, good tool life, fewer and simple adjustments, lower maintenance!

Have you witnessed production runs of difficult-to-make parts on National High Speed Headers? Observe the many features in machine and tooling. Start now to gain the benefits of sustained production at the highest safe speeds ever achieved!

We welcome you to Tiffin for actual demonstrations and a thorough study of your cold heading requirements.



** 1/8-inch High Speed Cold Header*
27,000 Parts Per Hour

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

HARTFORD DETROIT CHICAGO

NATIONAL MACHINERY CO.

TIFFIN, OHIO, U. S. A.

COVER ALL YOUR VINYL JACKETING NEEDS WITH THIS PX-PLASTICIZER LINE-UP!

What's your vinyl insulation compounding problem? Whether it's in processing or in arriving at required end properties, PX Job Rated Plasticizers provide a sound solution . . . *at low cost.*

Pittsburgh *primary* plasticizers for the wire industry impart a balanced combination of desirable properties. Elongation retention, tensile strength, resistance to chemical breakdown and to water and oil immersion are some of their outstanding characteristics. And these PX Plasticizers can be compounded to cover temperature ranges from 60°C to 105°C.

Consider quality, check-out economy . . . you'll find that Pittsburgh PX Plasticizers are your best buy. For more PX Plasticizer information or for assistance in developing a solution to your compounding problems, call or drop us a note on your letterhead.

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PITTSBURGH CHEMICAL CO.

GRANT BUILDING PITTSBURGH 19, PA.

A Subsidiary of PITTSBURGH COKE & CHEMICAL CO.

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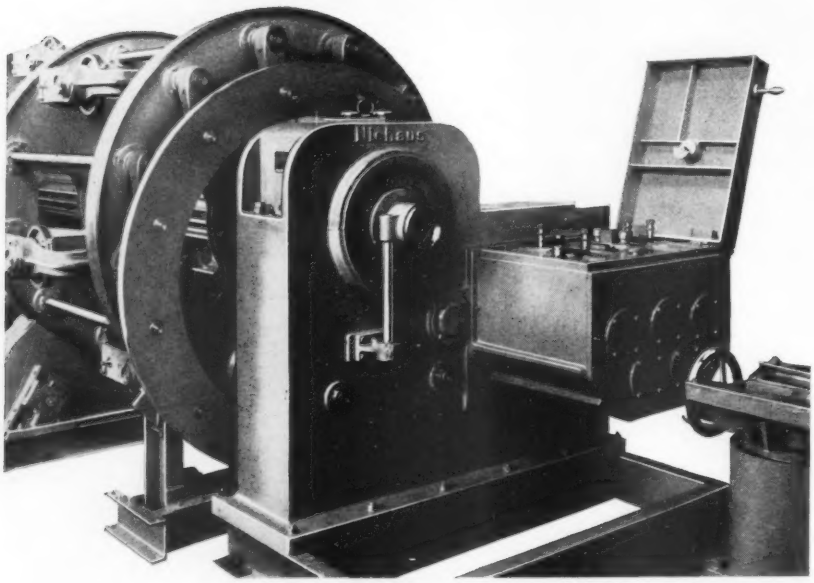
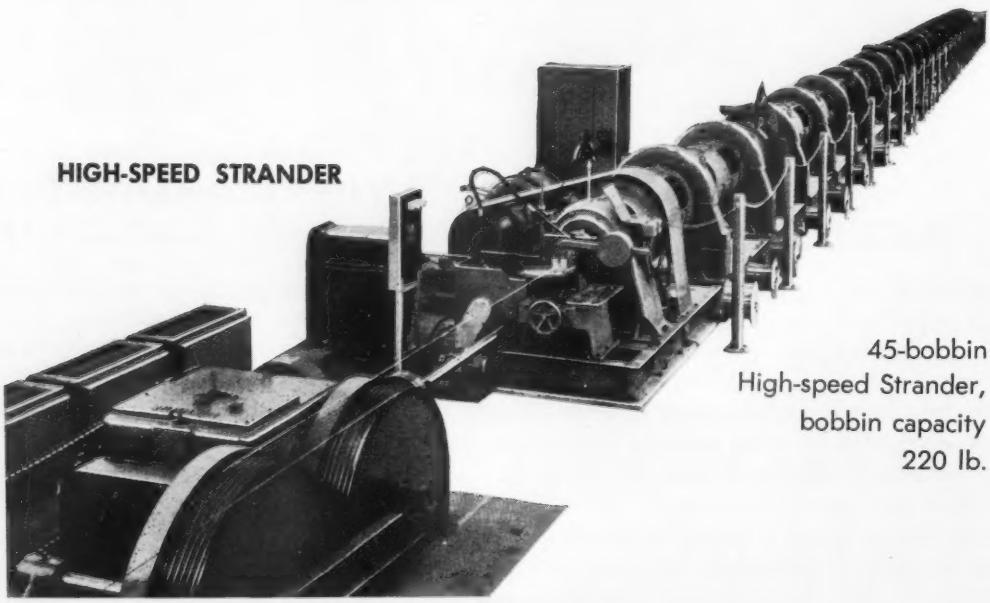
ELECTRIC-CABLE MACHINERY • WIRE-ROPE MACHINERY

PLANETARY STRANDER



We manufacture: Stranding and Rope-closing Machines of tubular and planetary design, of any size and for any number of bobbins, as well as the pertinent auxiliary machinery and equipment.

HIGH-SPEED STRANDER



45-bobbin High-speed Strander, bobbin capacity 220 lb.

MASCHINENFABRIK K. A. NIEHAUS • DUSSELDORF-RATH

Sole Representative: Paul Reicher Machinery & Equipment, Ltd., 600 Eglinton Ave., East, Toronto 12, Ont., Canada

Your Insulation Material Engineered to Your Specifications

IMPROVE
The Quality of YOUR Insulated Wire by Using
Kenmix® DISPERSIONS

TRADE MARK

Electrical properties and ozone resistance are greatly enhanced by the Kenflex® content in the KENMIX dispersion. KENMIX dispersions can be tailored to your specification as follows:

1. **A blend of accelerators in one KENMIX dispersion.**
2. **Various solids content.**
3. **Various KENFLEX® content.**

KENFLEX®, as the dispersing medium, eliminates the objections to older-type plasticizers; it improves the ozone resistance and electrical properties of the wire jacketing material; KENFLEX® is compatible with synthetic and natural rubbers.

KENMIX "tailor-made" dispersions help to blend in accelerators, vulcanizing agents and activators — or combinations thereof — into easy-to-handle, soft, medium, stiff or solid pastes. The compounder can select dispersions best suited to his specific application.

For Full Information Write

Samples of Kenmix Dispersions available upon request. Technical advice furnished. Write for Bulletin No. 6.

KENRICH PETROCHEMICALS, INC.
57-02 48th STREET, MASPETH 78, NEW YORK

THE ELECTRIC WIRE & CABLE SECTION
of
THE WIRE ASSOCIATION

The committee, appointed by the Association's Board of Directors, the Electric Wire and Cable Management Committee, extends to all persons interested in and concerned with the production of insulated wire and cable a cordial invitation to join with them in promoting the progress of this branch of the wire industry. This Management Committee, as of April 26, 1961, is comprised of:

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Bell Telephone Laboratories, Inc.
Murray Hill, N. J.

MEMBERS

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Olin Conductors Metals Div., Olin
P. O. Box 989, Chattanooga, Tenn.

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Canadian General Electric Co., Ltd.
107 Park St., Peterboro, Canada

W. R. Moyers, Chief Eng.
Wire Engineering Dept.
Western Electric Co.
P. O. Station B
Buffalo 7, N. Y.

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Box 35-A, Hickory, N. C.

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Michael M. Suba, Mgr. Extrusion Mkts.
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Consulting Cable Engineer
Anaconda Wire & Cable Co.
Hastings-on-Hudson, N. Y.

Dr. Robert C. Williams
Vice-Pres.-Research
The Ironsides Co.
270 W. Mound St., Columbus 15, Ohio

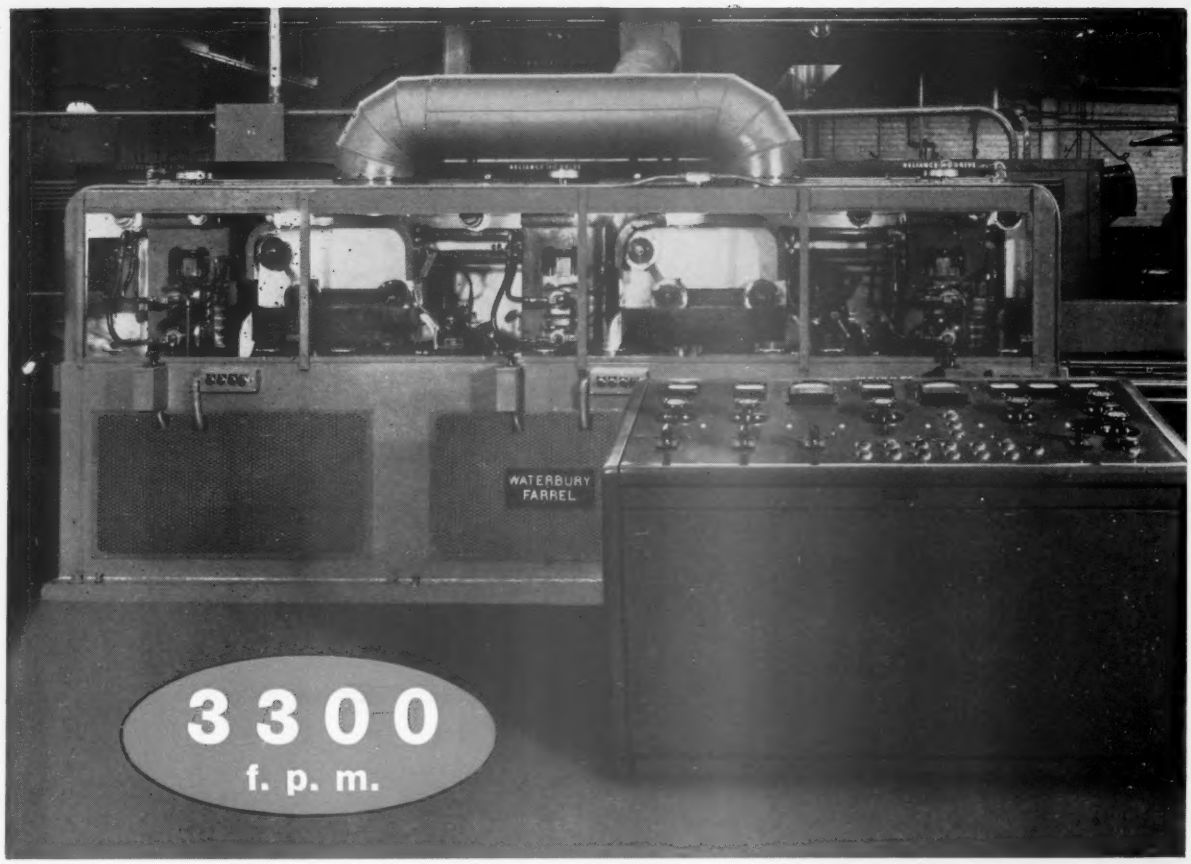
The committee arranges for papers for regional meetings and the Annual Convention, reviews them to see that they are desirable as to subject matter and quality, and formulates policies that will promote the best interests of insulated wire production personnel. Recent authorization to increase the membership to twenty-five will be implemented by further appointments in the near future.

You are invited to send for a booklet describing the activities of The Wire Association and a membership application card.

THE WIRE ASSOCIATION

RICHARD E. BROWN, EXECUTIVE SECRETARY

453 Main St. **Stamford, Conn.**



PRECISION *Wire Flattening* MILLS

THE WATERBURY FARREL 3-STAND TANDEM WIRE FLATTENING MILL, pictured above, is rolling close tolerance, high carbon steel wire at the Athenia Steel Div., National-Standard Co., Clifton, N. J., *at speeds up to 3300 feet per minute.* Tolerances are being held within 0.002" on width and 0.00025" on thickness of finished rectangular wire. Modern, cabinet type enclosure of the mill and its coolant troughs keeps the installation clean and facilitates the exhausting of fumes and evaporated coolant.

We invite you to contact us for your requirements in rolling mill equipment. In addition to Wire Flattening Mills, we design and build Sendzimir Cold Strip Mills, Two-High and Four-High Mills, Two-High/Four-High Combination Mills, Rod Mills, Special Mills, Gang Slitters, and Accessory and Auxiliary Equipment.

WATERBURY FOUNDED 1851 FARREL

THE WATERBURY FARREL FOUNDRY & MACHINE CO.

DIVISION OF TEXTRON INC.

Waterbury, Connecticut U. S. A.

Sales Offices: Chicago • Cleveland • Los Angeles • Millburn, N. J.

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reaches many prospects

YOUR SALESMEN DON'T KNOW!

No matter how big you are, the odds are you don't know all your actual prospective customers.

If your company is small, it is even more important to be "calling" on your prospects and customers regularly through advertising.

Your advertising in Wire and Wire Products will be seen by many people in the plants you wish to "sell", whom your salesmen never would see, yet who specify, actually buy or who influence decisions on products to be purchased. Your advertising is bound to be of immeasurable value to you, too, in paving the way for a good reception for your salesmen when they do call. And the field's buying power is tremendous!

WIRE AND WIRE PRODUCTS circulation is all paid. We have no agents, offer no premiums nor make special inducements to get circulation, except the value of the editorial contents in itself—yet our renewals have averaged 97% or better for many years. That's why it is a good and forceful advertising medium for all concerns who have products to sell to this vigorous and progressive industry.

———— • ————

Subscribers by Types of Mills in the Industry

1.	Rod, Bar and Wire (producers of rod, bar and wire in all metals and shapes)	38%
2.	Forming and Fabricating Plants (mfrs., largely from purchased wire, of springs, wire cloth, bolts, nuts, screws, rivets, wire forms, fences and fencing, wire specialties, wire rope and electric wire and cable)	59%
3.	Miscellaneous—Libraries, Research Organizations, Jobbers, Distribution, etc.	3%

Subscribers by Types of Positions Held

1.	Executives: Presidents, Vice Presidents, Secretary-Treasurers, Purchasing Agents, Sales Managers	22%
2.	Operating: Vice Presidents, General Managers, Works Managers, Superintendents and Assistant Superintendents.	58%
3.	Research and Maintenance: Plant Engineers, Metallurgists, Laboratory Technicians, Foremen and Inspectors	19%
4.	Libraries	1%

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• GET YOUR SHARE OF THE BUSINESS.....

• ADVERTISE IN WIRE AND WIRE PRODUCTS.....

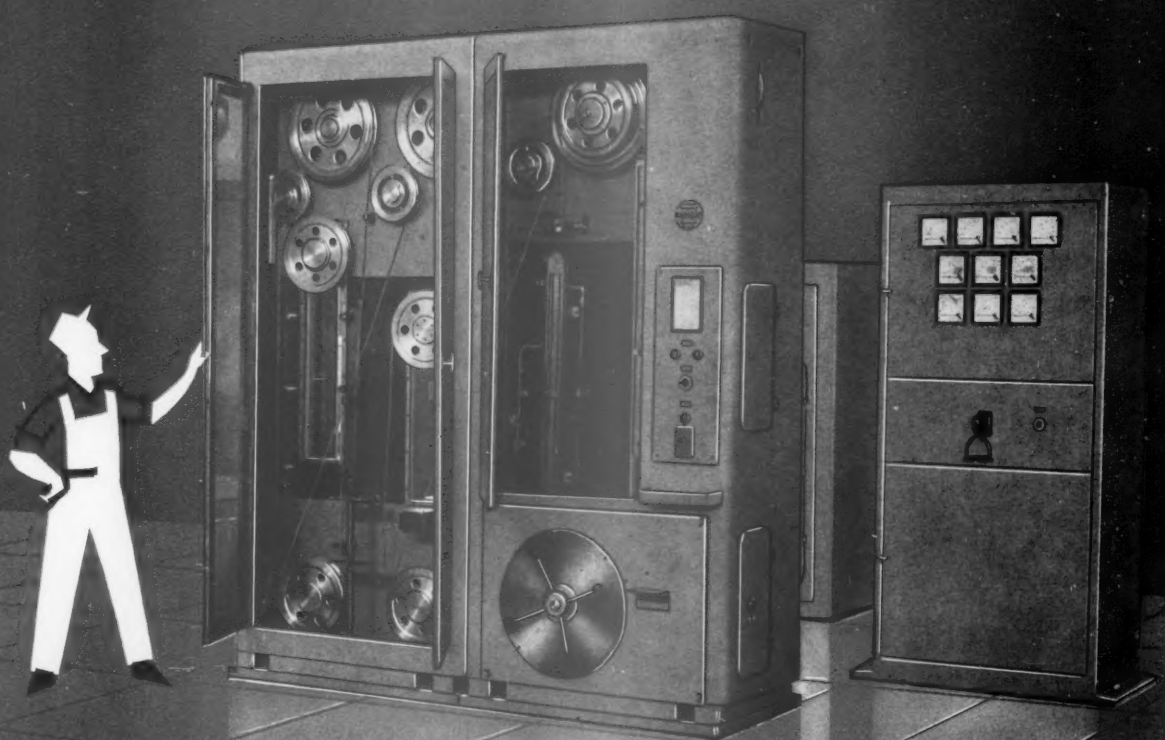
• SEND FOR ADVERTISING RATES TODAY.....

WIRE and WIRE PRODUCTS

453 MAIN STREET • STAMFORD, CONN.

NEW DEVELOPMENTS CONTINUE!

Large Continuous Electric Annealer VG 85 to be worked in combination with any copper rod break down machine, for bright annealed finished wire, for sizes between .14" and .048". Finishing Speeds up to 3000 to 4000 ft/min.



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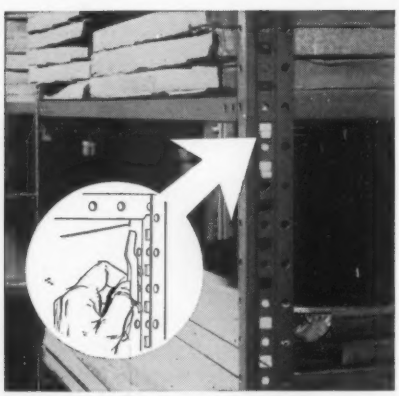
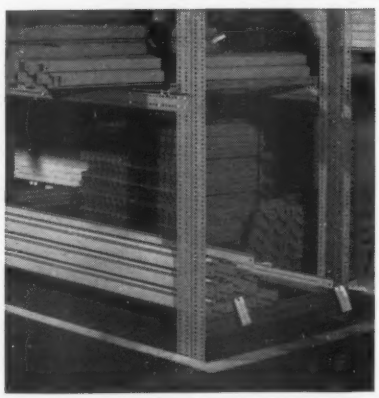
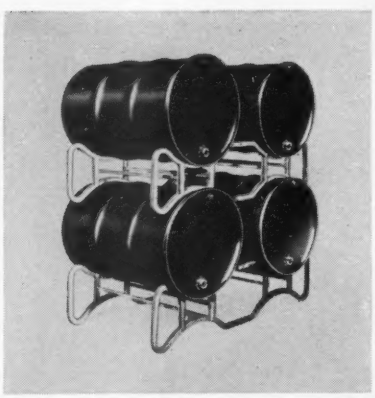


REPUBLIC CLIP SHELVING saves valuable floor space. Complete line, including shelves, parts, accessories, and related items. Every piece Bonderized. Erects fast, easy. No tools required. Adjustable arrangements meet changing shelving needs. The shelf snaps firmly into place. Let your Republic representative storage-engineer your shelving problems. Call, or send coupon today.



REPUBLIC METAL LUMBER provides faster, stronger, safer framing in any application where common building materials are now being used. Simply measure, cut, assemble. Engineered slotted angle pattern speeds erection, reduces time and material costs. Bonderized. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Call or write for attractive brochure.



REPUBLIC PORTABLE DRUM RACK . . . newest idea for storing 55-gallon drums. Strong and sturdy. Six-piece bolted construction. Assembles quickly and easily. Demountable for shipping. Designed for easy stacking and storing. Weighs only 39½ pounds. All-steel channel construction. Saves valuable floor space. Available for immediate delivery. Send coupon for more information.

RACK, STACK and PACK

Republic Standard Hopper End Boxes

They do it at Flexible Steel Lacing Co.

This manufacturer of belt fasteners for conveyor belting, racks and tilts standard Republic Hopper Boxes at a 45° angle along assembly counters. Parts slide down onto counters as needed.

Now, boxes packed with parts stack four and five high, saving floor space and eliminating clutter prevalent when former wooden boxes on casters were used.

This modern, efficient, small parts handling system is another example of how Republic Material Handling Specialists can adapt economical standard boxes to solve particular problems. This ingenious, money-saving system was engineered by Thornel Associates, Republic's Chicago material handling specialists.

Republic's big line of standard units can provide the basis for the system you need to speed operations, save space, time and money. Call your Republic representative or return coupon below.

Flexible Steel Lacing Company speeded assembly operations and took the stoop out of the job with Republic Corrugated Boxes. Special tilting racks behind work counters were designed to hold boxes at an angle so that parts fall onto the table as needed. Easy to stack and store, Republic Boxes save valuable floor space, too.

Strong, Modern, Dependable

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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Please send more information on the following products:

☐ Republic Material Handling Units ☐ Hopper Boxes
☐ METAL LUMBER® ☐ Clip Shelving ☐ Drum Racks
☐ Please have a Republic material handling specialist call

Name_____ Title_____

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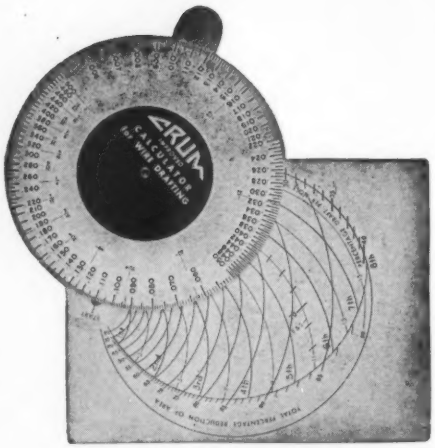
SAVE SET-UP TIME WITH THE...

CRUM CALCULATOR

FOR WIRE DRAFTING

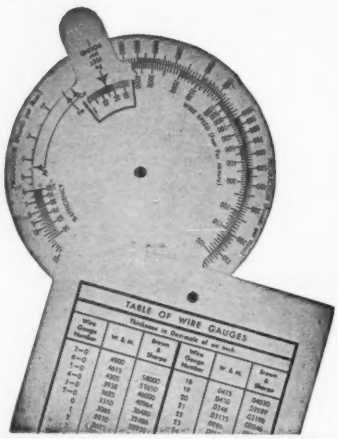
Useful and Accurate!



Front view of Crum Calculator

THIS NEW DOUBLE-PURPOSE CALCULATOR WILL:

1. **Provide quicker and more accurate information on die sizes and reduction areas;**
2. **Calculate wire production rates for various speeds and efficiencies.**



Reverse view of Crum Calculator

SOME OTHER FEATURES OF THE CALCULATOR

- Has new scale for more accurate determination of small percentages.
- Gives readings in B & S gauges.
- Intermediate lines provide reductions for 16 holes in one setting.
- New rectangular shaped back for better protection of calculator.
- More legible % draft-per-hole scale.
- Vinyl plastic construction, resistant to wear, warping, dirt, perspiration, wire drawing soaps—can be cleaned.
- Still fits your vest pocket.
- Handy tables of W & M and B & S gauges.
- Feet per pound calculating scale for steel, copper and aluminum wires.
- Durable, accurate, easy to use.

The improved Crum Calculator is worth its weight in gold in time saving—no laborious mathematical calculations necessary when you use it. Instruction sheet with examples accompany each Calculator. You should have one or more in your wire drawing department.

THE PRICE: $5.00 EACH

Send your orders to:

WIRE AND WIRE PRODUCTS

453 MAIN STREET **STAMFORD, CONN.**

(Exclusive distributors)

ROYLE
Paterson, N. J.

VECTOR CV*

by ROYLE

Offers cost advantages to producers of High Voltage Power Cable

Vector CV incorporates the good features of both horizontal and vertical CV systems without the limitations of either . . . limitations of cable size or height of building.

Since Vector CV utilizes the catenary curve — the only curve a cable can assume when freely supported at two points not in the same vertical plane — deformation and scuffing of the cable's outer jacket is eliminated, which tension alone cannot do.

Also a catenary curve can be adapted to any building and any size wire can be run in that curve. There is no need to build 7 or 8 story buildings in order to vulcanize large diameter cables.

Because Vector CVs are ordinarily planned with 200 feet of steam tube, the average rate of productivity is 300% higher than a vertical CV installation with a vulcanizing tube 65-70 feet high.

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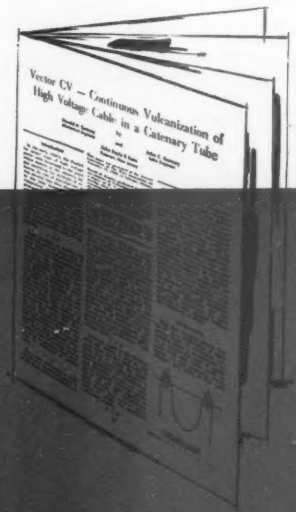

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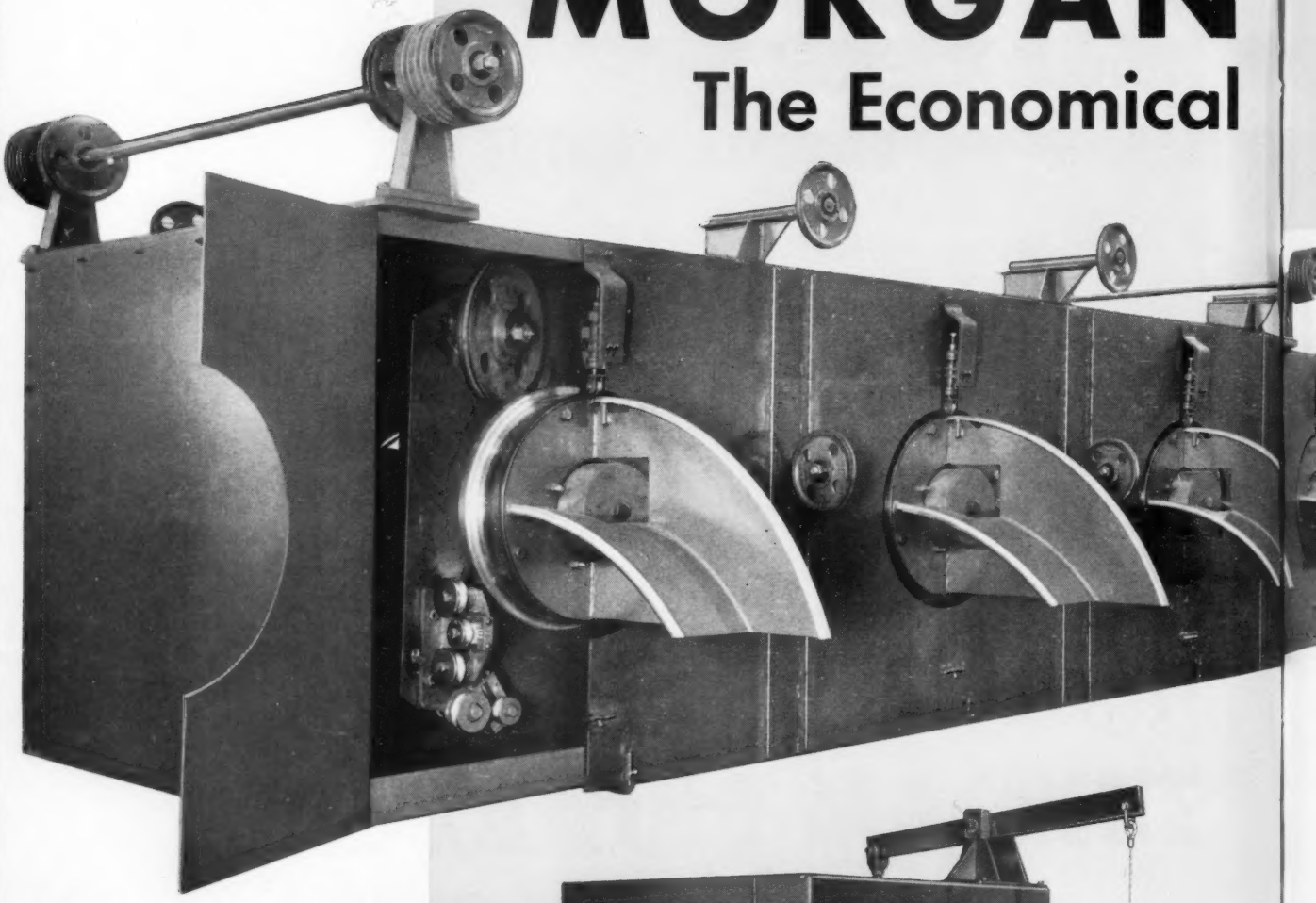

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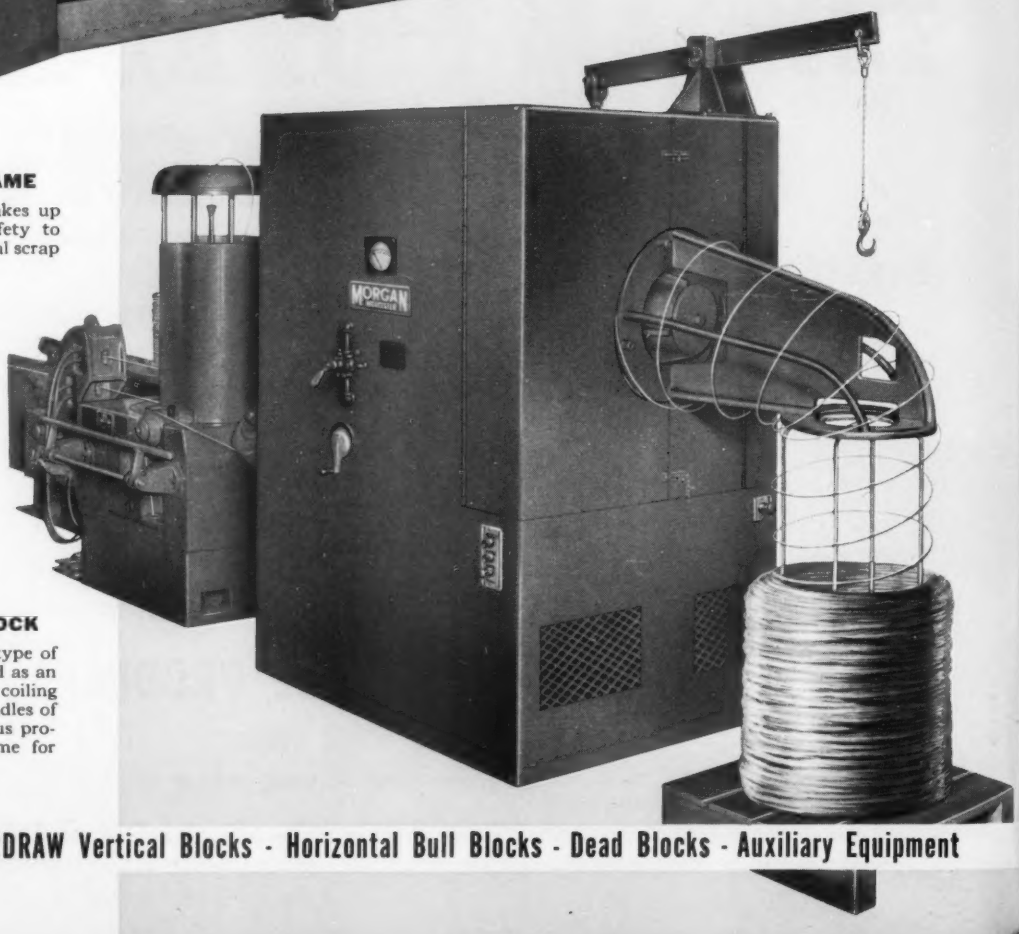

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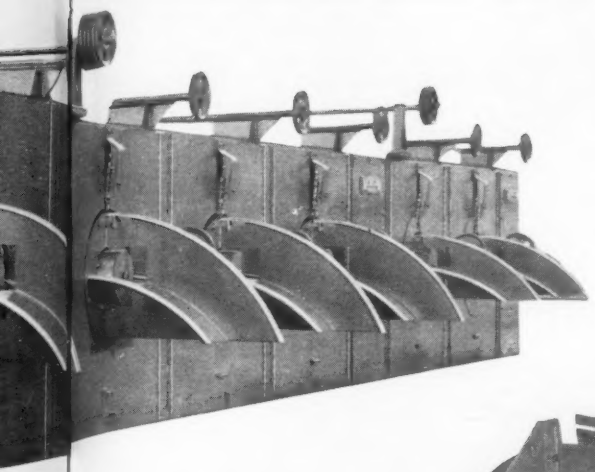

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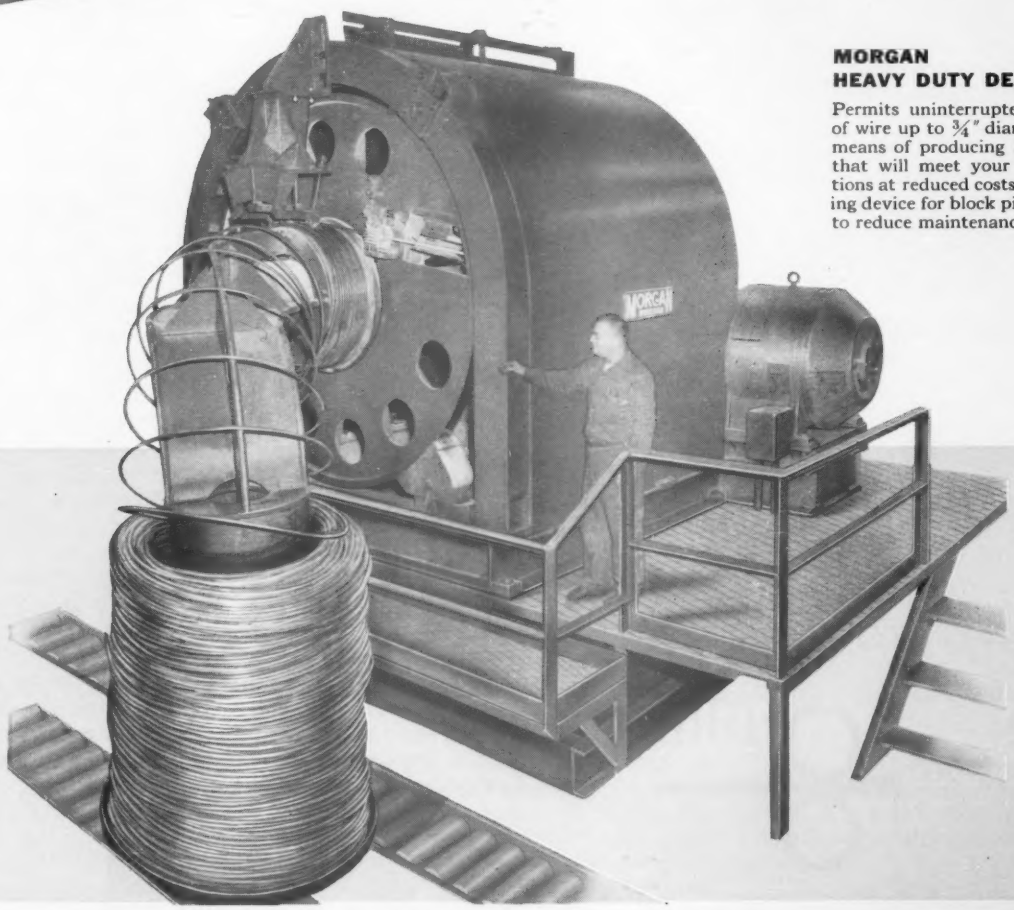

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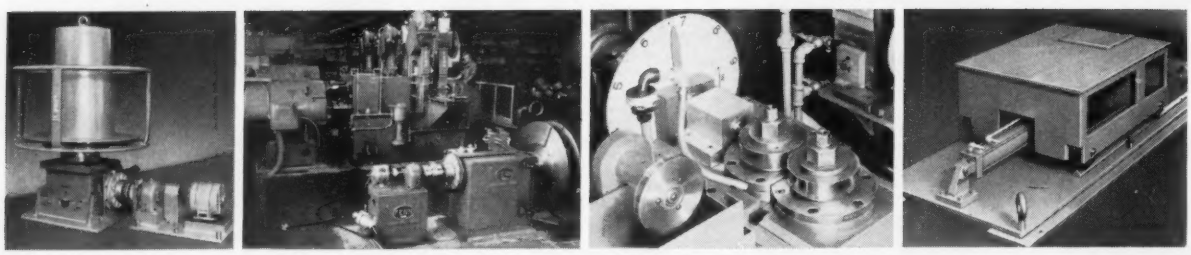

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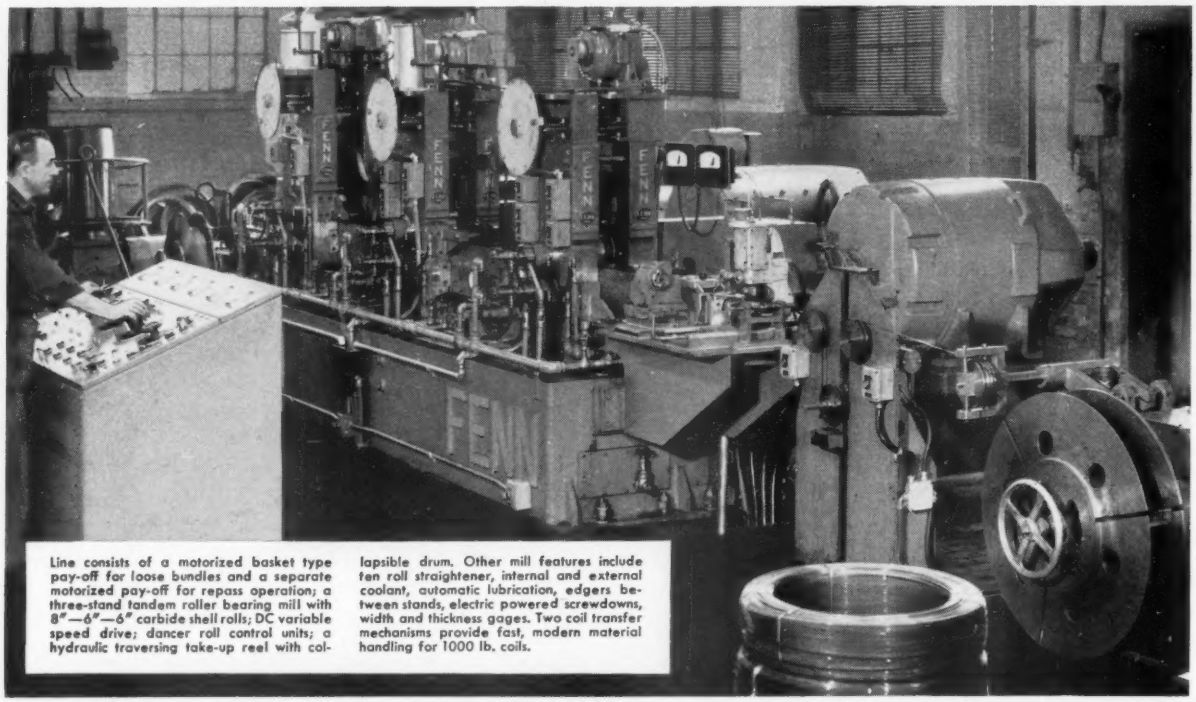

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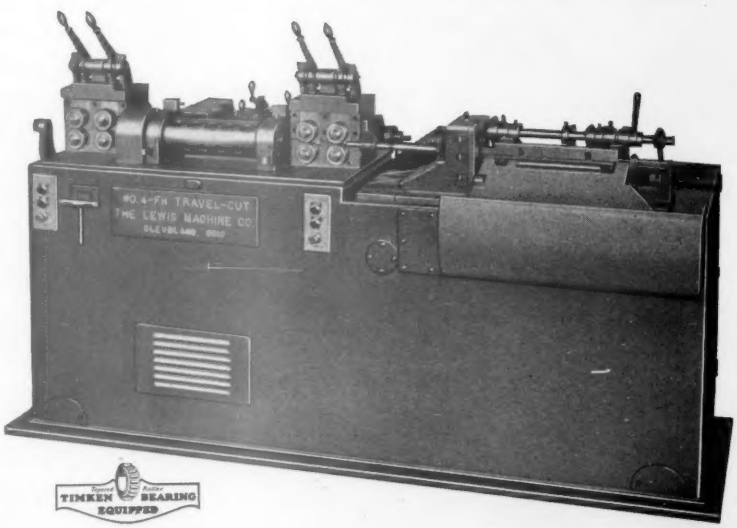

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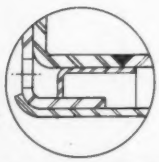

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The Wire Outlook

A noticeably better feeling is evident on all fronts, even though the upswing in business has been moderate. Contributing materially to improving activity is the buying of new cars, which started in March. A great majority of observers expect the trend to be gradual, but steady, in the coming months.

Competition is keen and it is likely that corporate profits will suffer in many areas. Big business is making strenuous efforts to solve the problem by trimming production costs. Much of this should result in renewed efforts to modernize production equipment and procedures.

For many years anything that could be made could be sold. This easy era has passed and competition from both within and without the country is spurring efforts to produce more economically and to develop new products that will supplant the old. This competition extends to materials as well as processes.

Supporting the feeling that business will improve is the reaction of stock market traders, whose activities in discounting the future have pushed blue ribbon stock prices to new all-time highs. Actually many equity securities at this writing are selling at prices that are all out of proportion to corporate earnings and technical corrections are within the realm of possibility. Nevertheless, the year should wind up with prices higher than at present.

The recovery pattern is running counter to previous recessions. Upturns usually start in the latter half of a year. Bank deposits, too, normally decreasing in a recession, have been growing. These factors can be taken to indicate that the economy is sound basically, needing more than anything else a confidence in the future.

Unemployment statistics pose a paradox. During the recession it rose to the highest point in our history, yet the number of persons gainfully employed is comparable to periods of high business activity. The high levels of unemployment are expected to continue for some time—a matter possibly of years—even when production gets back on to more normal levels. Contributing to unemployment are increased efforts to automate production processes, the establishment of manufacturing units abroad, and the growing volume of imported products.

Construction took an upward spurt in March, home building has risen over last year's levels, and the machine tool industry is starting to show increasing signs of activity.

While most phases of the economy are better and the wire industry has reflected the general tone of business, wire has not kept pace with other industries, especially on tonnage items. Specialty wire mills appear to be doing better than heavy wire mills, and, in fact, many are working around the clock.

The larger mills are endeavoring to develop better products and more specialties to offset the loss of business to overseas producers.

There has been a seasonal improvement in the demand for merchant wire products, but not nearly as much as expected. Cold heading wire and manufacturers' wire are among the better items. Prestressed strand demand has been disappointing. Brass wire mill product shipments have improved materially over last year. Wire for building construction is moving well. And cold drawn bar orders have improved to a point that has necessitated extending deliveries by one to two weeks.

Business analysts now feel that recovery is off to a solid start. A continued confidence will bear the fruit of an eventual full recovery.

Edmund D. Sickels

EDITOR

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DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 36 MAY, 1961 No. 5

Wire Mill Solves Materials Handling Problem with Construction Machine

by T. D. Crimmins
Chief Plant Engineer
Wickwire Spencer Steel Division
The Colorado Fuel & Iron Corporation
Palmer, Massachusetts

A unique use of a modified excavator to unload rod coils from gondola cars results in savings in time and handling costs.

The Colorado Fuel & Iron Corporation's **Wickwire Spencer Steel Division** at Palmer, Massachusetts, is probably the first wire drawing mill in the world to use a hydraulic excavator, common to the construction field, for unloading steel rod coils from gondola cars. The application of the **Warner & Swasey** Hopto 500 was a direct result of an extensive analysis of existing methods of materials handling in the yard, and recommendations for improvement made by our Engineering Department.

* * *

At the start of the project, the Engineering Department made a complete layout of the existing tracks and storage area along with an analysis of the handling methods for unloading gondola cars. The old method required the use of 25-ton steam locomotive cranes with 50 ft. booms. A chain had to be inserted through the rod bundles, attached to the crane hook, and the bundles lowered to the ground. The rods were unloaded in approximately 6,000 lb. lifts, 10 coils of 600 lbs. each, with each car holding about 166 coils. The limited reach of the locomotive crane's boom necessitated a series of parallel tracks, the distance of which was governed by the reach of the crane. This required considerable switching of cars as the crane's boom could only reach the length of one car. As the coils were un-

Fig. 1 — Unloading gondola cars with the "Hopto" Excavator. * *

Fig. 2 — Rod is placed on ground before transfer to storage area. *

loaded, they were heaped on the bare ground. This method of random piling was unsatisfactory for several reasons. Rods on the ground level rusted and coils became entangled and distorted beyond salvage, and there was always the possibility of coils becoming mixed. This method of piling also caused problems when coils were picked up from storage and transferred to flatcars. In winter weather it was especially difficult.

* * *

The goal of the Engineering Department was to set up a more economical system of materials handling in the yard, while at the same time provide the mill with a clean undistorted wire rod that would run better on subsequent processing equipment. The new project was in the planning stage for several months and even included cooperating with CF&I's Buffalo plant, where the rod is made, on how to load the gondola cars.

* * *

The all hydraulic Warner & Swasey Hopto 500, manufactured by the Warner & Swasey Company's Badger Division, Winona, Minnesota, was selected for the unloading operation and the entire program centers around it. Under the combined efforts of Warner & Swasey and C.F.&I. engineers, several minor modifications were made on the machine. The cab was elevated four feet and moved forward one foot so that the operator would have an unobstructed view into the car. It was also equipped with remote control so that the operator could propel the unit along the entire length of the unloading platform. This platform will accommodate eight cars.

Fig. 3 — After unloading, 10,000 lb. capacity fork truck moves rod coils to storage area.

* * *

The major change, however, is in the machine attachment. Where normally an excavating bucket would be attached to the dipper stick of the Hopto, the unit was equipped with a hairpin hook six ft. long. The hook can be swiveled 240°, tipped and angled. Now the Hopto operator can unload a gondola car without assistance. He simply guides the hook into the coils, picking up six each time. He then strategically stacks them in an upright position along the support rail for further handling. This ability, along with minimized distortion of coils are two of the major advantages of the new handling system.

* * *

After the cars have been unloaded by the Hopto, the rods are moved to final storage by means of a 10,000 lb. ram truck. When the rods are required for new production schedules, they are removed from the rod storage area by means of a second ram truck. This method of handling also eliminates the need of the locomotive cranes which were formerly used.

The new storage area is laid out in the shape of a flat iron. It is a concrete slab 8" thick that has been poured on a well compacted gravel sub base. The slab is also pitched to assure maximum drainage of rain or melting snow from around the rod coils in storage. In building the new spur, which will accommodate eight cars along the side of the storage area, 117 lb. railroad rails made by C.F.&I. Corporation at their Pueblo plant, were installed to replace the light rails formerly used. The 60 lb. and 80 lb. rails that were removed were cut up and used for the vertical and horizontal members of the backstops required to maintain the rod coils in a vertical position. Wide aisles have been provided with each lot of rods being easily accessible. The storage of these rods on this slab is a major step in quality control, eliminating rod distortion and unnecessary waste.

* * *

Many companies have overhead cranes or other mobile cranes for unloading steel rods from gondola cars; but this is the first time a truck-mounted, full hydraulic backhoe has been used for this operation. The results have been less expensive, more efficient means of unloading and stacking rod coils. There has also been a considerable reduction in the man hours required to perform these duties. Quality control in the yard is now a reality and is reflected throughout the mill. This new method of materials handling is a working example of the ingenuity and farsightedness of our engineers.

THE WIRE ASSOCIATION

Extends a cordial invitation to all wire men to become a member and participate in its activities. Whether you are engaged in the manufacture of products involving ferrous wire, nonferrous wire or electric wire and cable, you will find matters of interest and value to you. Membership includes a subscription to WIRE AND WIRE PRODUCTS and a copy of the directory, the WIRE AND WIRE PRODUCTS BUYERS' GUIDE.

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RICHARD E. BROWN
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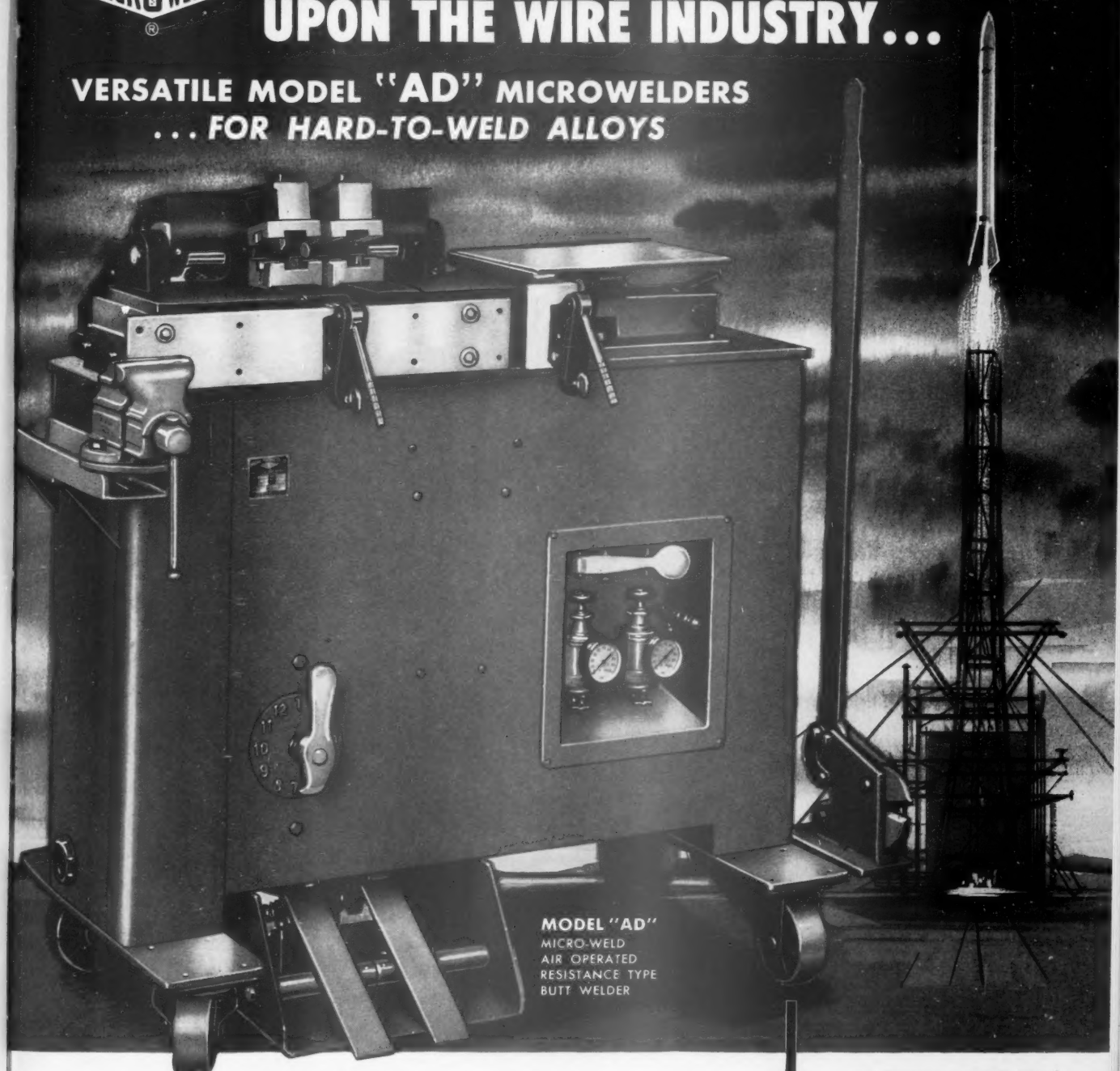

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3/8" to 3/4" diam. alum. and alum. alloy
3/8" to 5/8" diam. copper and copper alloy
3/8" to 5/8" diam. steel and steel alloy

AD-5
1/2" to 3/4" diam. alum. and alum. alloy
1/2" to 3/4" diam. copper and copper alloy
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Some Recent Studies of Electrical Grade Fillers in Butyl Rubber and Other Insulating Materials

by W. F. Fischer
Enjay Laboratories
Linden, New Jersey

This paper was presented at the Ninth Annual Symposium of Technical Progress in Communication Wire and Cables, held under the auspices of the U. S. Army Signal Research & Development Laboratory from November 30 to December 2, 1960, at Asbury Park, N. J.

Summary

Established long-term performance and processability of butyl high voltage insulation is currently based on the use of calcined clay as the major mineral filler. Continued research on other mineral fillers has disclosed that a select type of filler, platy talc, imparts markedly higher dielectric strength to butyl insulation compounds. Compared to clay and Whiting fillers average dielectric strength is increased from 700 to 1200 volts per mil which suggests the use of thinner walled cable insulation. Partial use of the select talc in cable insulation used at intermediate voltages has, in one case, made the use of semiconductive tapes unnecessary by improving resistance to failure. Other good electrical properties combined with low moisture absorption make the talc acceptable for most electrical insulation compounds.

* * *

The peculiar plate-like structure of this talc also improves cured physical properties 30-50 per cent over the clay filler. It imparts a smooth surface to extruded articles, increases resistance to flow of uncured compounds, and may be of use in nonelectric molded and proofed goods where resistance to permeation by gases or liquids is desired. Promotion of the filler with a chemical agent like Elastopar improves uncured properties and increases cured modulus 20-30 per cent. Overall processing and physical property data on platy talc compounds detailed in the paper show no significant deficiencies in comparisons with calcined clay, calcium carbonate and other types of talc fillers in butyl rubber. A one-step mixing procedure for butyl-platy talc compounds is described.

* * *

Comparisons of dielectric strength of platy talc with other fillers in polyethylene, polypropylene and polyvinyl chloride plastics indicate the platy talc sustains the high dielectric strength of the plastics at 1800-2000 volts per mil. Nonplaty mineral fillers tend to decrease resistance to electrical failure.

Introduction

Satisfactory use of butyl as high voltage cable insulation dates back to about 1945 and volume electrical use of butyl began about 1948-1949. Processing and good initial performance with long-term stability of the insulation depended mainly on the use of calcined clay as the major mineral filler. Minor amounts of water-washed calcium carbonate, hard clay and in some cases, pyrogenic silicon dioxide have been used to improve factory processability of the uncured insulation or physical strength of the vulcanizate to acceptable levels. Use of high physical strength fillers like fine particle size precipitated silica and talcs has always been limited by less stable electrical properties in water. It has been found that a select type of talc, platy talc, shows improved water resistance as compared to other types of talc fillers. This property coupled with a remarkable improvement in resistance to dielectric failure and physical strength promises to facilitate and broaden the use of butyl insulation and should be of use in other insulation materials.

* * *

This paper compares properties of platy talc with calcined clay in butyl rubber and illustrates important differences in properties believed related to particle size and shape within the talc family of fillers. The term "talc" is generally used in referring to a commercial filler representing a single structural type such as platy, fibrous, acicular or granular, or any combination of these four basic types. Talcs are complex structures of basically magnesium silicates that may contain minor amounts of calcium, aluminum, sodium, potassium and possibly other metals. Clay is basically aluminum silicate.

Electrical Properties of Mineral Fillers

A. Dielectric Strength

Dielectric strength is a property that helps determine the wall thickness of insulation for safe operation of electrical equipment and wire and cable at different voltage levels. High dielectric strength or resistance to electrical breakdown is desired since it means less insulation is required for protective purposes.

* * *

Mineral fillers, particularly calcined clay, are used in butyl for reasons of processability, physical properties and economy. Processing principles and physical and electrical properties of mineral filled butyl rubber insulation have previously been described*. From an ideal viewpoint, the inclusion of "foreign" fillers having inferior electrical properties and causing

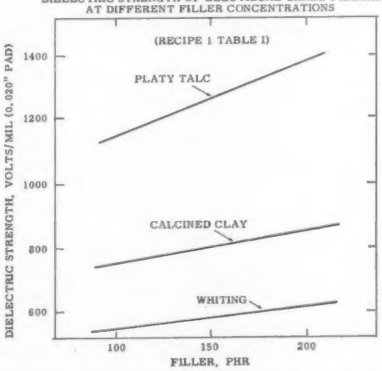
* References 1, 2

electrical dissimilarity** should decrease the dielectric strength of butyl rubber. This appears to be more true as we will see later with crystalline polymers than with amorphous butyl rubber. Despite this divergence from the ideal, the integrity of butyl high voltage insulation containng clay filler is well established***. We have found, however, a new filler called platy or micaceous talc that introduces a "shape factor" that substantially improves the dielectric strength of butyl and promises to find a place in other insulation materials.

* * *

Comparative breakdown levels with other electrical grade fillers in butyl are illustrated in Figure 1. Platy talc provides more than

FIGURE 1
DIELECTRIC STRENGTH OF ELECTRICAL GRADE FILLERS AT DIFFERENT FILLER CONCENTRATIONS



double the resistance to dielectric failure of Whiting and shows a 50 per cent improvement over calcined clay. Dielectric strength increases with filler concentration for all fillers. Our dielectric strength test impresses a voltage which increases at 1 KV per second on 0.020-in. thick butyl rubber pads until a puncture occurs. Laboratory results have been confirmed by on-wire factory tests of thicker walled butyl insulation. Basic formulations used in laboratory studies are listed in Table I.

* * *

The improved breakdown resistance attributed to the plate-like shape factor embodied in platy talc is independent of butyl polymer type or cure system as shown in Figure 2. Compared with calcined clay in a quinoid cure, resistance to failure is improved 90% with platy talc.

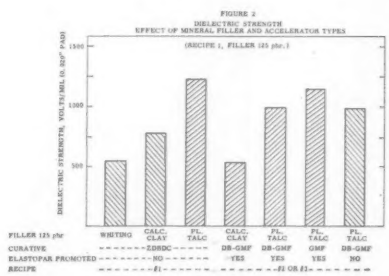
TABLE I
BASIC FORMULATIONS

Recipe No.	1	2	3	4
HR-035	--	100	100	--
HR-165	--	--	--	100
HR-215	100	--	--	--
Elastopar	--	1**	1**	--
Zinc Oxide	5	5	5	5
Magnesium Oxide	--	--	--	10
Stearic Acid	1	1	1	0.5
Zinc Stearate	--	--	--	4
Fillers*	100-150	125	125	120
ZDBDC (1)	1.5	--	--	--
ZDBuDC (2)	1	--	--	1
MBTS	1	--	4	1
TDEDC (3)	--	--	--	1.5
Sulfur	2	1	--	1.5
Polyethylene (4000 MW)	--	--	--	6
Paraffin Wax	--	5	5	--
Red Lead	--	5	5	--
DB-GMF (4)	--	6	--	Transfer Molding Compound
GMF (5)	--	--	1.5	

(1) Zinc dibenzyl dithiocarbamate
(2) Zinc dibutyl dithiocarbamate
(3) Tellurium diethyl dithiocarbamate
(4) Dibenzoyl p-quinone dioxime
(5) p-quinone dioxime

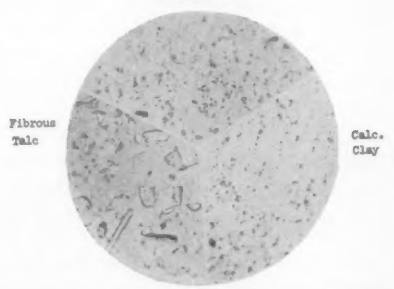
* Platy talc, calcined clay or Whiting as indicated.
** Where indicated

FIGURE 2
DIELECTRIC STRENGTH
EFFECT OF MINERAL FILLER AND ACCELERATOR TYPES



Microscopic examination of the mineral fillers alone at 200 magnification provides some idea as to the wet and dry electrical behavior and physical properties of cured butyl insulation containing these fillers. A comparison of clay and talc fillers pictured in Figure 3 shows little distinction between clay and platy talc with one exception. Clay is uniformly small in

FIGURE 3
(Photograph of Fillers)
200 Magnification
Platy Talc

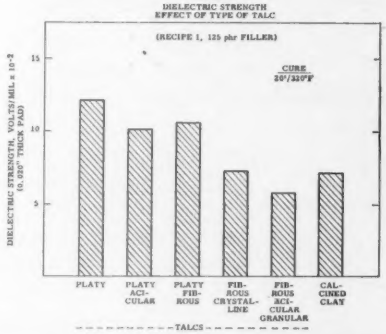


particle size while occasional large particles of platy talc may be a topside view of a flat platelet. While not clearly evident in this photograph, the lamellar structure of platy talc has been confirmed by examination using electron photomicrographs. A fibrous-crystalline or nonplaty talc, supposedly of similar average particle size but containing some very large particles, evidences a greater variety of shapes including rod and needlelike forms. As discussed below, it is these shapes and particle size, as well as composition, that determine the good and bad performance of talc fillers in butyl.

B. Effect of Talc Type on Dielectric Strength

Early success with a platy talc in improving voltage breakdown precipitated a study of the four basic types of talc represented in Table II. Results illustrated in Figure 4 indicate a very slight dilution of an essentially pure platy talc with a minor proportion of acicular or fibrous types causes some decrease in dielectric strength. Elim-

FIGURE 4
DIELECTRIC STRENGTH
EFFECT OF TYPE OF TALC



ination of the platy type altogether as exemplified by the fibrous-crystalline and fibrous-acicular-granular types causes a substantial decrease in resistance to dielectric breakdown of the butyl insulation. Having firmly established the benefit of the 100% platy talc structure, we speculate on how it works as shown in Figure 5.

* * *

It is postulated that electrons flow at boundaries*. Considering this, platy talc oriented within the butyl insulation matrix by extrusion or compression molding provides a longer electron path than other particle shapes. This postulated interlocking plate effect could also minimize voltage induced heat effects which are said to decrease the dielectric strength of a material** by requiring more energy to mechanically rearrange the talc filler particles as may occur by

** Reference 3
*** References 4, 5, 6

* Reference 7
** References 8, 9

TABLE II

COMMERCIAL TALCS EVALUATED AS FILLERS FOR BUTYL

Supplier	Crystal Structure*	Particle Size, Microns Average	Maximum	Per Cent 10 Microns	Specific Gravity
A	Platy	3	6	100	2.75
B	Platy	5	--	--	2.98
B	Platy	10	--	--	2.85
A	Platy	1	5	100	2.76
D	Platy-Acicular	< 15	15	96	--
D	Platy-Acicular	< 20	20	92	--
A	Platy-Fibrous	1	5	100	2.79
A	Platy-Fibrous	4	12	97	2.79
C	Fibrous-Crystalline	6	35	68	2.76-2.85
C	Fibrous-Crystalline	3	20	90	2.76-2.85
C	Fibrous-Acicular Granular	5	--	76	2.85
E	Calcined Kaolin Clay	--	--	--	2.6

* Physical property data was abstracted from the Suppliers' Technical Information Publications. Average particle sizes are approximate values obtained from various sources possibly using different methods of analysis.

TABLE III

ELECTRICAL PROPERTIES * OF QUINOID CURED BUTYL INSULATION

Recipe, Table I, No.		2	2	2	3	3
Curative		DB-GMF	DB-GMF	DB-GMF	GMF	GMF
Elastopar Promoted		No	No	Yes	No	Yes
Filler		Calc.Clay	Platy Talc	Platy Talc	Platy Talc	Platy Talc
Dielectric Strength Volts/mil. (0.080" pads)		520	980	990	1220	1140
Dielectric Constant,	Orig.	3.06	2.77	2.75	2.76	2.74
After Days in	7 days	3.26	3.03	3.04	3.04	2.98
85°C. Water	7 mos.	3.91	4.88	4.49	3.74	3.77
Power Factor, %	Orig.	0.41	0.42	0.44	0.53	0.64
After Days in	7 days	0.60	0.99	0.82	1.12	1.17
85°C. Water	7 mos.	1.64	1.52	1.89	2.1	2.24
D.C. Resistivity, ohm cm x 10^{14},	Orig.	22.0	24.4	19.7	19.5	18.9
After Days in	7 days	12.0	11.0	13.0	17.0	13.0
85°C. Water	7 Mos.	2.7	0.4	2.5	3.1	3.0
Water Absorption, mg./in.^{2}	Orig	6	9	9	5	5
After Days in	7 days	10	16	15	10	10
85°C. Water	7 mos.	30	104	100	82	73

* Measured on 6" x 6" x 0.75" pads before and after immersion in water. Formulations and physical test data are in Table I and Appendix Table II.

FIGURE 5

POSTULATED ELECTRON PATH THROUGH A DIELECTRIC CONTAINING PLATY TALC AND A NONPLATY FILLER

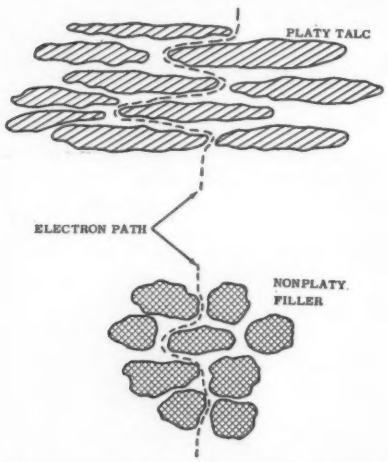
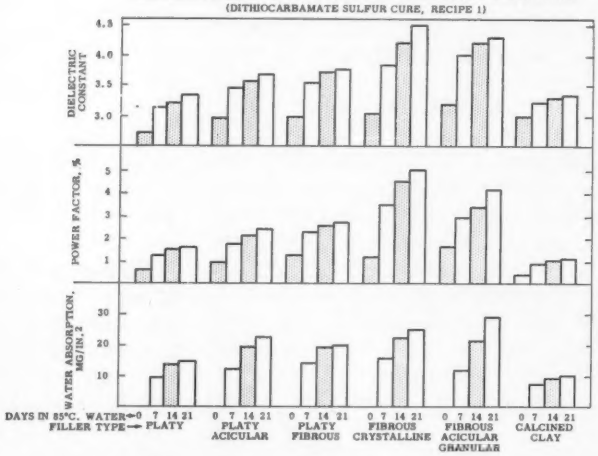


FIGURE 6

ELECTRICAL STABILITY OF TALC FILLED BUTYL COMPOUNDS IN 85°C. WATER (DITHIOCARBAMATE SULFUR CURE, RECIPE 1)



polarization. Not all*** agree on how temperature affects dielectric failure. Prior work **** also indicated a correlation of mechanical strength with dielectric strength. Our results agree with this correlation since platy talc imparts the highest hardness, modulus and tensile strength to butyl as compared to all other fillers studied. Physical properties are described in Section IV of this paper.

C. Other Electrical Properties

An insulation must also have acceptable values for dielectric constant, power factor and insulation resistance and show satisfactory stability in water for most applications. Electrical properties of quinoid cured butyl reported in Table III indicate platy talc has about the same high quality initial electrical properties as calcined clay, but slightly inferior stability on water immersion. All water absorption values are exceptionally low for these test conditions. Despite the higher water absorption of platy talc after a severe test of seven months of 85°C., the good retention of original electrical properties coupled with high dielectric strength make it attractive for use in many electrical applications where the best water stability is not required. For more demanding high voltage insulations, a blend of fillers is suggested that compromise water stability with improved dielectric strength.

* * *

Electrical properties of the different types of talc studied in a dithiocarbamate sulfur cured butyl compound are shown in Figure 6 and Appendix Table I. Results show the expected lower stability level of electrical properties in water as compared to the quinoid cure but are interesting since we can distinguish between types of talc. Recalling the rod and needle-like shapes in the photo-micrograph it appears that even a minor amount of the acicular or fibrous type in a basically platy talc adversely affect electrical stability and water absorption. This is even more apparent in the nonplaty fibrous-crystalline and fibrous-acicular-granular types where we believe the long thin particle shapes facilitate penetration of water by a wicking action causing substantial changes in power factor and dielectric constant. This is a good argument for a 100% platy talc which approaches calcined clay in performance.

Physical Properties of Fillers in Butyl Rubber

A. Conventional Fillers and Platy Talc

Concurrent with the acceptance of butyl as a better high quality electrical insulation material was the grudging acceptance of lower physical strength. It has been our

*** Reference 10
**** Reference 11

APPENDIX TABLE I

ELECTRICAL PROPERTIES OF TALC FILLED BUTYL COMPOUNDS

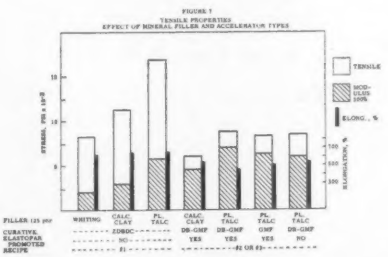
(Dithiocarbamate Sulfur Cure, Recipe 1)

CPD. No.	Filler Type	Average Particle Size	Days 85°C. Water	Dielectric Constant (1)	Power Factor, % (1)	D.C. Resistivity ohm cm x 10^{14}	Dielectric Strength (2)	Water Absorption mg./in.^{2}
1	Platy Talc	3	0	2.78	0.81	5.8	1185	--
			7	3.24	1.22	3.7	--	9
			19	3.36	1.40	2.7	--	14
2	Platy Talc	5	0	2.74	0.37	5.6	1165	--
			7	3.00	1.22	3.6	--	8
			19	3.16	1.40	2.8	--	15
3	Platy Talc	10	0	2.78	0.45	5.4	950	--
4	Platy Talc	1	0	2.85	1.10	4.8	1235	--
			7	3.32	1.62	2.9		9
			19	3.40	1.73	2.3		15
5	Platy-Acicular Talc	<15	0	2.98	1.05	5.1	1010	--
			7	3.45	1.69	2.3		12
			19	3.66	2.33	1.9		22
6	Platy-Acicular Talc	<20		2.99	1.36	5.9	1020	--
7	Platy-Fibrous	1	0	2.97	1.08	6.1	990	--
			7	3.48	2.33	2.3		11
			15	3.72	2.52	2.3	80	--
8	Platy-Fibrous Talc	4	0	2.98	1.20	5.1	1085	--
			7	3.55	2.25	2.5		14
			19	3.73	2.45	2.7		19
9	Fibrous-Crystalline Talc	6		3.19	1.33	4.8	740	--
10	Fibrous-Crystalline Talc	3	0	3.12	1.08	5.1	735	--
			7	3.85	3.39	2.3		16
			19	4.47	5.03	2.3		25
11	Fibrous-Acicular Granular	5	0	3.17	1.47	5.6	580	--
			7	4.01	2.93	2.4		12
			19	4.29	3.41	2.0		28
12	Calcined Kaolin Clay	--	0	2.99	0.39	4.5	705	--
			7	3.21	0.83	2.5	--	7
			19	3.32	0.98	2.1	--	10
13	Electrical Grade Mica	--	0	2.98	1.06	3.6	730	--
			7	3.40	1.96	2.8	--	9
			19	3.67	2.30	2.4	--	16

(1) At 1 KC, 77°F.

(2) Volts per mil. Quick Rise Test. One KV per second.

goal to find a satisfactory filler that would embody both good electricals and high physical strength to meet requirements for both high and low voltage applications. Platy talc approaches this goal. Results illustrated in Figure 7 show a substantial 40-50% increase in tensile for both dithiocarbamate sulfur and quinoid cures. Tensile strength

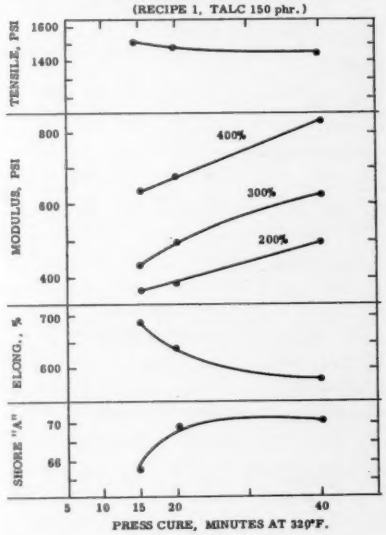


of sulfur cured vulcanizates fall in the 1600-2000 psi range. It is interesting also to note the similarity between the modulus values of Figure 7 and dielectric strength measurements of Figure 2 that seemingly confirm the postulated correlation between these properties. Physical properties of quinoid curatives are detailed in Appendix Table II.

FIGURE 8

EFFECT OF CURE TIME ON PHYSICAL PROPERTIES OF PLATY TALC

(RECIPE 1, TALC 150 phr.)



modulus values.

B. Effect of Talc Type on Physical Properties

Physical properties of cured butyl containing representative members of the talc family of fillers show widely different properties related to particle size and struc-

APPENDIX TABLE II

PHYSICAL PROPERTIES OF QUINOID CURED BUTYL INSULATION

Recipe, Table 1, No.		2	2	2	3	3
Curative		DB-GMF	DB-GMF	DB-GMF	GMF	GMF
Elastopar Promoted		No	No	Yes	No	Yes
Filler		Calc.Clay	Platy Talc	Platy Talc	Platy Talc	Platy Talc
	Tensile	500	900	825	900	825
Cure	Modulus 200%	320	425	520	450	550
	300%	400	510	600	550	625
10' @ 320°F.	Elongation, %	500	570	500	550	490
	Shore "A"	58	60	60	63	65
	Tensile	600	850	875	950	825
Cure	Modulus 200%	400	500	600	475	525
	300%	490	600	700	575	625
20' @ 320°F.	Elongation, %	590	500	480	550	500
	Shore "A"	64	66	64	65	65
	Tensile	550	900	850	700	825
Cure	Modulus, 200%	400	550	625	450	525
	300%	450	625	700	550	600
30' @ 320°F.	Elongation, %	520	540	450	450	500
	Shore "A"	64	67	67	63	65
	Mooney Scorch @ 250°F. Time to a 3-10 Pt. Rise over Min.	30 -	19-28	28 -	4-6	4.5-6

Effect of concentration of platy talc and other electrical grade fillers in a dithiocarbamate-sulfur cure of butyl are presented in Table IV and cure curves for talc plotted in Figure 8. Of particular interest is the economical concentration of 200 parts of talc in butyl that has 1100 psi tensile, 1400 volts per mil dielectric strength and is flexible with an elongation of 525 per cent. Compared to Whiting or calcined clay the platy talc vulcanizates are 5-15 points harder at 60-75 points Shore A and feel tougher due to more than double ture. Platy talc again offers double the tensile and modulus values recorded for some nonplaty talc fillers and clay as shown in Table V.

C. Chemical Promotion and Flow Properties

Chemical treatment of butyl with Elastopar during mixing with active fillers causes polymer to filler bonding that improves uncured green strength and can improve modulus, flexibility and electrical resistivity of the vulcanizate. Platy talc apparently has a moderately active surface chemical

TABLE IV

EFFECT OF CONCENTRATION OF MISTRON VAPOR TALC ON PHYSICAL PROPERTIES AND DIELECTRIC STRENGTH

(Recipe 1)

Compound No.	0	1	2	3	4	5	6	7	8
Variables									
EB-215	100	100	100	100	100	100	100	100	100
Calcined Clay	100	150	200						
Whiting				100	150	200			
Platy Talc							100	150	200
Physicals-Cure 20'/325°F.									
Tensile, psi	1250	875	725	925	725	650	1850	1525	1150
Modulus at 200%	225	250	275	150	125	100	400	525	500
Modulus at 300%	275	275	300	175	150	150	500	625	700
Modulus at 400%	330	350	350	225	200	180	600	750	850
Elongation, %	660	630	620	610	610	620	675	620	535
Shore "A" Hardness	55	60	65	50	52	60	60	65	73
Dielectric Strength V/mil	630	760	835	540	480	595	1150	1220	1400

TABLE V

PHYSICAL PROPERTIES OF TALC FILLED BUTYL COMPOUNDS

(Dithiocarbamate - Sulfur Cure, Recipe #1)

Compound No.	Filler Type, 125 phr.	Average Particle Size, μ	Tensile	Modulus 200%	Modulus 300%	Elongation %	Shore "A"
1	Platy Talc	3	1600	450	525	640	64
2	Platy Talc	5	1325	375	425	630	63
3	Platy Talc	10	1175	350	400	620	63
4	Platy Talc	1	1450	450	500	620	63
5	Platy-Acicular Talc	<15	975	300	350	620	60
6	Platy-Acicular Talc	<20	950	300	325	620	60
7	Platy-Fibrous Talc	1	1200	350	400	630	63
8	Platy-Fibrous Talc	4	1100	300	350	620	61
9	Fibrous-Crystalline Talc	6	950	200	250	670	55
10	Fibrous-Crystalline Talc	3	700	150	200	600	54
11	Fibrous-Acicular-Granular Talc	5	775	200	250	620	56
12	Calcined Kaolin Clay	--	750	250	275	600	59
13	Electrical Grade Mica	--	550	225	250	510	61

TABLE VII

COMPRESSION PROPERTIES

Stock No.	Identity Filler	Identity Cure Type	Shore Hardness	Compression* Set, %	% Deformation** at 300°F.
0	Platy Talc	Sulfur (a)	54	49.3	6.2
1	Platy Talc Elastopar Promoted	Sulfur	56	41.8	5.7
2	Calc. Clay Elastopar Promoted	DB-GMF (b)	65	26.4	6.5
3	Platy Talc	DB-GMF	65	44.3	5.8
4	Platy Talc	GMF (c)	61	41.5	7.2
5	Platy Talc Elastopar Promoted	DB-GMF	66	33.3	6.5
6	Platy Talc Elastopar Promoted	GMF	62	41.0	9.8
9	Platy Talc Elastopar Promoted	Sulfur (d) Donor	58	52.0	9.5

Formulation: EB-035, 100 filler (as indicated) 125, zinc oxide 5, stearic acid 1, paraffin wax 5, Elastopar (only where indicated) 1, cure systems (as indicated).

* Method ASTM-D-395-55, average of two determinations.
** Flow of cured 5/8" dia. x 0.5" thick pellets under 5 KG load at 300°F. for 30 mins.

Cure Systems:

(a)	Zinc dibenzyl dithiocarbamate	1.5	(b)	DB-GMF	5	(c)	GMF 1.5
	Zinc dibutyl dithiocarbamate	1.0		Red Lead	9		Red Lead 5
	MBTS	1.0		Sulfur	1		MBTS 4
	Sulfur	1.5					
(d)	Zinc dibutyl dithiocarbamate	3					
	MBT	3					
	TMT tetrasulfide	3					

TABLE VI

CHEMICAL PROMOTION OF SYSTEMS CONTAINING TWO ACTIVE MINERAL FILLERS

Compound No.	0	1	2	3	4	5	6	7	8	9
Variables										
EB-215	100	100	100	100	100	100	100	100	100	100
Elastopar	1	1	1	1	1	0.6	0.3	--	1	1
Hard Clay	130	100	65	30	--	--	--	--	110	--
Platy Talc	--	30	65	100	130	130	130	130	--	110
Hi Sil	--	--	--	--	--	--	--	--	20	20
Physical Properties Press Cure 20'/320°F.										
Tensile	1550	1450	1575	1400	1400	1450	1525	1550	1325	1400
200% Modulus	500	475	425	450	500	450	375	350	425	550
300% Modulus	600	575	500	550	575	525	450	450	525	625
Elongation, %	715	700	705	660	685	680	690	645	675	645
Shore "A"	58	60	62	63	64	64	63	62	60	65
High Speed Garvey Extrusion										
Inches/Min.	59	58	62	60	65	67	62	-	68	70
gms./inch	2.43	2.22	2.23	2.17	2.11	2.10	2.15	-	2.32	2.01
gms./min.	144	129	138	130	137	141	133	-	158	141
Rating	12	13.5	14	14	15	15	15	16	15	15
Smoothness	Fair							Excellent		

Formulation: Polymer and other ingredients (as indicated), Zinc Oxide 5, Stearic Acid 1, Petrolatum 5, Sulfur 2, Arazate 1.5, Butyl Zimate 1, Altax 1, U.O.P. -88 2

structure to effect some modest gains in modulus as shown in Table VI. Resistance measurements were not made since nonpromoted talc filled butyl approached the limit of our resistivity apparatus.

* * *

The presence of a second active filler, hard clay, causes a lowering of modulus of Elastopar promoted platy talc compounds below the modulus level of either active filler alone. This has been observed before and is attributed to interference between dissimilar particle shapes.

* * *

Extrusion of smooth thin walled mineral filled butyl articles, like wire insulation, is rather difficult. Garvey die extrusions presented in Table VI indicate an excellent smooth surface for a butyl compound containing 130 phr of platy talc. Subsequent work comparing platy talc in butyl at equal volume loading with other fillers indicates the Garvey rating is improved from a marginal 12 to a very good 15. These observations have been confirmed in factory extrusion processing. Data are not reported.

* * *

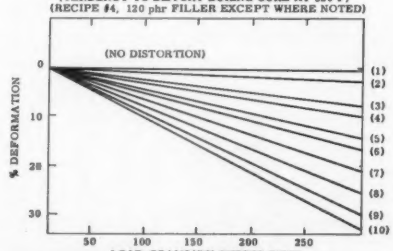
Deformation during cure of formed articles such as cable insulation, window channels and extruded gaskets of thick cross-sectional area can be minimized by use of platy talc. Results of a laboratory test devised to measure flow during cure at 320°F. are illustrated in Figure 9. Compared to electric grade fillers normally used like calcined clay and clay stiffened with silica dioxide and water washed calcium carbonate, platy talc at 8% deformation is markedly superior considering de-

FIGURE 9

EFFECT OF FILLER TYPE ON FLOW

(TENDENCY TO DISTORT DURING CURE AT 320°F)

(RECIPE #4, 120 phr FILLER EXCEPT WHERE NOTED)



(1) HYDRATED PRECIPITATED CALCIUM SILICATE
(2) ATTAPULGUS CLAY
(3) PRECIPITATED HYDRATED SILICA 60 phr
(4) PLATY TALC
(5) 99.2% PURE SILICA DIOXIDE 20 phr, CALC. CLAY 100 phr
(6) HARD KAOLIN CLAY
(7) CALCIUM CARBONATE
(8) ALUMINUM OXIDE TRIHYDRATE
(9) CALCINED KAOLIN CLAY
(10) DIATOMACEOUS EARTH

formation values of 12-30% for the other fillers. The test procedure consisted of loading molded uncured one-inch cubes with various weights and then curing the weighted cubes 40 minutes at 320°F. in a steam autoclave. The deformation of the cubes during the initial heat plasticizing phase was measured after the cure was completed.

D. Cured Compression Set Properties

Good compression resistance and set properties of rubber insulated wire and cable are essential to maintaining trouble-free operation. Limited data presented in Table VII indicate that platy talc at 33% set is not quite so good as calcined clay at 26% set in a DB-GMF cure. Constant load ASTM D-395-55 Method A was used for this purpose. Other cure systems studied show a distinctly higher compression set level of 41-52%.

* * *

It is essential to know an insulation will perform satisfactorily under high load — high heat conditions at points of compression. A laboratory test that measured deformation of precured butyl pellets 5/8" in diameter and 0.5" thick under a 5 kilogram load at 300°F. for 30 minutes, shows platy talc and calcined clay are equal at 6.5%. Pellets were inserted cold into a Williams parallel plate plastometer at 300°F. All deformation values fall in a low 5.7-9.8% range.

Processing Platy Talc with Butyl Rubber

Some platy talcs because of their fluffy, low bulk density characteristics caused initial difficulty in Banbury mixing. Dead mixes resulted. This problem was overcome by adding with each addition of talc the minimum amount of plasticizer necessary to start the batch working. The procedure proved very effective in decreasing Banbury mixing times and excellent vulcanizate physical and electrical properties were obtained. Dump temperature of the initial mix without accelerators was 320°F.

* * *

An economical weather resistant butyl insulation compound totally mixed in seven minutes in a one-step Banbury mix using this procedure but having a dump temperature of 230°F. is shown in Table VIII. The compound designed for long-term use outdoors has good tensile and electrical properties. Dielectric strength of 800 volts per mil could be improved to 1200-1300 volts per mil without impairing tensile strength by eliminating most of the carbon black. Potential applications for this compound include low voltage wire and molded electrical accessory goods.

TABLE VIII

BUTYL WEATHER RESISTANT INSULATION
(ONE STEP MIX)

Formulation

	Enjay Butyl 218	100
	Mistron Vapor Talc	110
	SPC Black	10
	SRF Black	15
	Zinc Oxide	1
	Stearic Acid	1
Protective Agents	Sunolite 127 Wax	3*
	Paraffin Wax	2*
	Dioctyl p-phenylene diamine	2*
	Triethanolamine	2*
Curatives	Sulfur	1.25
	Tetrone A	1.0*
	Tellurac	1.5*
	Captax	1.0*
		254.75

Physical Properties (Pad)

Cure 335°F.	Tensile	300% Mod.	Elongation, %	Shore "A"
5'	1525	350	690	60
8'	1800	485	690	62
12'	1950	550	660	65

One Step Mixing Procedure (Banbury High Speed)

Time, Mins.	
0	Polymer in (water on)
1/2	Carbon black, zinc oxide
1	1/3 talc, stearic acid, 1/3 total wax
2	1/3 talc, 1/3 wax
3	1/3 talc, 1/3 wax, TEA
4	Accelerators, UOP-88
5	Sulfur
7	Dump 230°F.

NOTE: An alternate one step mixing procedure that works well consists of masterbatching those ingredients marked with an asterisk plus 5 phr of talc in the melted wax. Add masterbatch at times above where wax is indicated.

Dielectric Strength of Platy Talc In Other Insulation Materials

Considering the substantial enhancement of resistance to dielectric failure in butyl, it was desirable to know how the plate-like talc behaved in other insulation materials. Studies of dielectric strength in the more crystalline plastics confirm its improved performance as compared to a fibrous type of talc and other electric grade fillers. Results listed in Tables IX and X indicate the more crystalline plastics like polyethylene, polypropylene and plasticized polyvinyl chloride have an inherently high dielectric strength of 1800-2100 volts per mil in our quick rise voltage test. At a low filler concentration of 30 parts, platy talc holds the line at this high level or slightly increases dielectric strength of the plastics while calcined clay decreases resistance to failure of polypropylene by 600 V/mil and PVC by 250 V/mil. Compared to a fibrous-crystalline talc in P.E. and P.P., platy talc shows a 150-200 V/mil advantage.

TABLE IX

DIELECTRIC STRENGTH OF INSULATION MATERIALS

Stock No.	Insulation Materials	Dielectric Strength, Volts/Mil* No Filler	Fibrous Crystalline Talc	Platy Talc	Calcined Clay
1	Polyethylene 21,000 Molecular Weight	1800	1780	1910	--
2	Polypropylene	2100	1850	2045	1450

Formulation: Plastic 100, filler (as indicated) 30.

* Molded Pads 6" x 6" x .020" Thick

* * *

Another type of rubber vulcanizate containing fibrous talc gave 1300 V/mil versus 1600 V/mil for platy talc which further confirms the desirable improvement in dielectric strength with this filler.

Conclusions

The unique plate-like shape, particle size and composition of select platy talc make it of value in enhancing the dielectric strength of insulation materials. In flexible butyl rubber insulation the marked improvement in resistance to elec-

(*Please turn to page* 652)

TABLE X

PROPERTIES OF PLATY TALC IN POLYVINYL CHLORIDE RESIN (PVC)

Stock No. 9-224-	0	1	2	3	4	5	6
Polyvinyl Chloride Resin	100	100	100	100	100	100	100
Didecyl Phthalate	52	52	52	52	52	52	52
Dibasic Lead Phthalate	6	6	6	6	6	6	6
Dibasic Lead Stearate	1	1	1	1	1	1	1
Bisphenol A	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Platy Talc	15	30	50	--	--	--	--
Calcined Clay	--	--	--	15	30	50	--
Whiting	--	--	--	--	--	--	30
Tensile, psi	2600	2550	2250	2500	2350	2000	2550
Modulus 200%, psi	2200	2300	2200	2100	2000	1850	2000
Elongation, %	305	295	260	310	315	265	350
Hardness, Shore "A"	92	94	95	92	93	94	91
Dielectric Strength(1), Volts/Mil	2000	2060	2160	1670	1790	1810	1810
Dielectric Constant	4.61	4.62	4.59	4.65	4.63	4.76	4.83
Power Factor, %	8.5	8.2	7.7	8.4	8.1	7.8	8.2
D.C. Resistivity, ohm-cm x 10^{14}	1.6	6.7	5.6	13	9.9	13	0.3

(1) A PVC composition without a mineral filler has a dielectric strength of 2,000 volts/mil.

REVISION OF THE WIRE ASSOCIATION BY-LAWS

From time to time members of the Board of Directors of The Wire Association have called attention to the need for revision of the By-Laws to keep pace with changing circumstances resulting from the constantly broadening Association activities.

At the November, 1960, meeting of the Board, a By-Laws Revision Committee was appointed from the members of the Board of Past Presidents. These are:

ALLAN B. DOVE, *Chairman*
Product Development Metallurgist
The Steel Company of Canada, Limited
Hamilton, Ontario, Canada

LEONARD C. CREWE, *President*
Maryland Fine & Specialty Wire Co.
Cockeysville, Maryland

LESLIE C. WHITNEY, *Manager*
Development Engineering
Copperweld Steel Company
Glassport, Pennsylvania

MEMBERS' SUGGESTIONS SOLICITED

The current By-Laws will be found on pages 6 to 10 inclusive of the Yearbook Section of the 1960 WIRE AND WIRE PRODUCTS BUYERS' GUIDE AND YEAR BOOK OF THE WIRE ASSOCIATION. Association members are requested to study these and send any suggestions to Mr. Dove, the Committee Chairman. All such opinions will be welcomed and will receive full consideration.

In many cases, provisions of the By-Laws have become out-dated by the rapid growth of the Association and our members' ideas will help the Committee to cover every possible angle before submitting the proposals to the Board. Following the Board's approval, the changes recommended will then be submitted to all members for their approval.

Will you kindly let Mr. Dove have your ideas?

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

453 Main Street **Stamford, Conn.**

A Brief Survey of Wire Rod Defects — Their Occurrence and Detection

by G. Earnshaw, Esq.
Research Manager
Frederick Smith & Company Wire Manufacturers, Ltd.
Halifax, England

This paper was presented at the Staff School of Frederick Smith & Co. Wire Manufacturers Ltd. in Halifax in June, 1960, by which firm it is copyrighted. It is published by the permission and through the courtesy of the author's company.

The present trends in steel-making, rod rolling and wiredrawing are all towards greater production from fewer—more expensive and more complex—units of plant running at higher speeds and efficiencies, and served by improved mechanical handling facilities.

* * *

As ferrous wiredrawing machine finishing speeds creep upward towards 3,000 feet a minute or thereabouts—speeds that only a few years ago were considered as being practicable only in copper or mild steel drawing—it becomes of even greater importance that machines run at maximum efficiency. Overhead costs per machine are much heavier in the modern plant, where a small group of high speed machines are capable of producing the same output tonnage as four or five times their number of the older, slow moving machines which they replaced.

* * *

Lubrication, heat-treatment and surface preparation of inlet material, and die design and quality must all be of the highest order and the wire manufacturer can, and must, take steps to control these factors and maintain the high standards required.

* * *

The raw material fed to the machines must be consistent in quality and drawability, in order that continuous production may be maintained free from stoppages due to wire failures. It is here that the wire manufacturer faces a real problem since mass production steel-making and rod-rolling techniques can, on occasion, lead to a reduction in rod quality, over which the rod user has no control.

* * *

A fault in steel manufacture, if not quickly discovered or possibly not discovered at all, could result in the production of a considerable quantity of rods outwardly appearing sound and yet containing a serious defect which could cause a failure, and consequently loss of production during wiredrawing, failure during final inspection of finished wire or even, and most serious of all, cause failure during use of the drawn wire.

* * *

It would perhaps be in order at this point to note that the steel makers are constantly striving to improve steel and rolling quality and that much progress has been made during the past few years, particularly on the steel-making side. The wire manufacturer, however, has—or can have—a clearer idea of the quality of wire rod than the actual rod-roller and only close liaison between the rod-roller and the wire manufacturer can bring about the maximum possible improvement.

* * *

Inspection of samples taken from all consignments of incoming wire rod has proved beneficial to the wire manufacturer in reducing machine down time due to failures in production, by enabling the Production Planning Department to allocate material to appropriate orders and isolate at the rod stage any material which is considered unsuitable for any drawing whatsoever.

* * *

The types of defect usually encountered in wire rod can be divided roughly as follows:

a. Steel-making defects — Axial segregation, pipe and inclusions.
b. Surface defects arising during casting or rolling — Laps, seams, fins, slivers, etc.
c. Structural defects — Excessive decarburisation and coarse grain size.

* * *

These will now be considered in greater detail.

Steel-making Defects

The most common steel-making defects are pipe and segregation, which are formed during cooling of the teemed ingot. The outer skin of the ingot cools quickly and in cooling and solidifying contracts, causing the molten centre to sink, sucking down any impurities which are floating on the top surface of the metal and even giving a true pipe or cavity if the contraction is sufficiently severe. The cavities are inevitably coated with oxide, so that they cannot be closed and welded during subsequent rolling and the only remedy is to remove the fault by cropping the ingot. Any pipe which is not cut away will persist throughout rolling and wire drawing, impairing the mechanical properties of the finished product due to the non continuity of the structure. Segregation is related to pipe, but rather than a cavity, this fault is due to the concentration of carbon, sulphur and phosphorus gathered at the molten centre of the ingot below the pipe. (Figure 1).

* * *

In the medium/high carbon range, faults due to the steel-making process are not now so prevalent as they were in the immediate post-war years, thanks to improved techniques and adequate cropping. Hot feeder tops are now used extensively on top of the ingot moulds and provide a molten pool of steel which can flow down into the ingot proper during the cooling cycle. Any pipe formed is normally confined to the feeder top

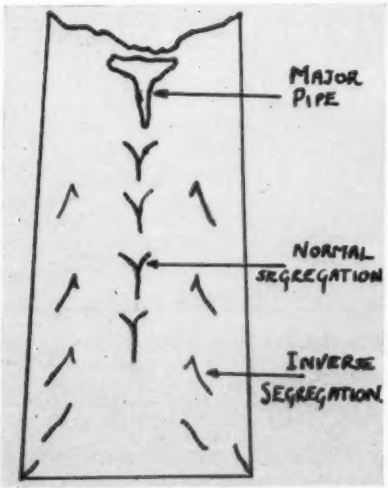


Fig. 1 — Sketch showing a cross section of an ingot with piping and segregation revealed.

portion of the ingot and cropping need not extend far into the ingot proper to remove the piped material. The use of hot tops has been extended during the last two years to steels in the lower carbon ranges and has had a markedly beneficial effect on the quality of the resultant wire rod.

* * *

Non-metallic inclusions are usually the products of de-oxidisation, there being very little chance of their being eliminated owing to the late stage in steelmaking at which they are formed. Small, evenly distributed inclusions are not generally harmful but localised concentrations can be the cause of failure. Inclusions cannot be detected by the rapid routine tests which will be described later; the usual method of estimating them is to carry out an inclusion count whilst examining a polished sample of the steel under a microscope. The inclusion count is a very slow and laborious test which cannot readily be applied to commercial testing, although it can be applied on periodic spot checks or on material intended for special work.

* * *

On rare occasions relatively large fragments of refractory material from a furnace or ladle lining may be trapped in the steel and persist through to the wire rod, and give a failure of the type shown in Figure 2 in which the fragment of refractory is clearly visible as a white core. Unfortunately there is very little which the wire manufacturer can do at the moment to detect faults of this type at the rod stage, but take cold comfort from the fact that failure is virtually bound to occur at an early stage in wiredrawing and not during use of the finished wire by the Customer. Failures of this type are fortunately few and far between and involve loss of machine time rather than material; but when they do occur, the failure should be reported back to the steel maker for such action as he considers necessary to minimise the likelihood of recurrence.

Fig. 2 — Photograph at approximately 5x magnification showing a fracture which occurred in 10g wire due to the pressure of a large fragment of refractory material in the steel. The refractory material shows up white against the grey of the steel. * * * * * *

Surface Defects

Under the general heading of "Surface Defects" are grouped the wide range of surface flaws which can arise during teeming of the ingot or during any of the subsequent rolling passes.

* * *

During examination of faults in 5 gauge hot-rolled rod it is virtually impossible to say with any certainty whether a flaw originated in teeming or rolling, excepting in severe cases where the fault obviously occurred during the later stages of rolling and the rod is badly misshapen or cracks penetrate deeply into the material.

* * *

The most common faults encountered are fins and laps. 'Fins' or 'overfills' are formed at the last pass when the feed is too large, resulting in metal being squeezed into the narrow clearance between the rolls (Figure 3). If the fin is

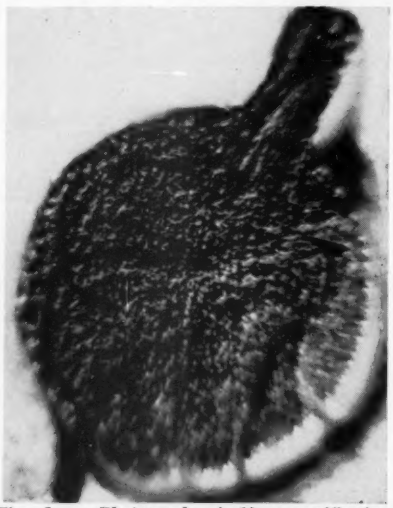


Fig. 3 — Photograph at 10x magnification showing a cross section of a badly shaped 5g rod. The sample has been etched in acid, which revealed that there were several surface cracks in the steel. * * * * * * *

formed at an intermediate pass rather than the finishing stand, then on turning for the next pass the fin is rolled back into the surface of the main body of the material. As the billet or rod surface is covered with a layer of mill-scale and the rolled-in fin cannot weld or heal to the main part of the rod but is always separated from it by a thin layer of oxide, thus there remains a crack during further rolling or wire drawing (Figure 4).

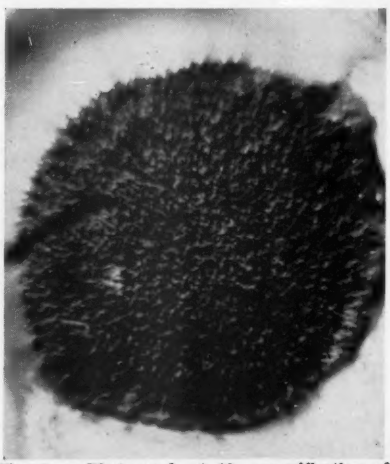
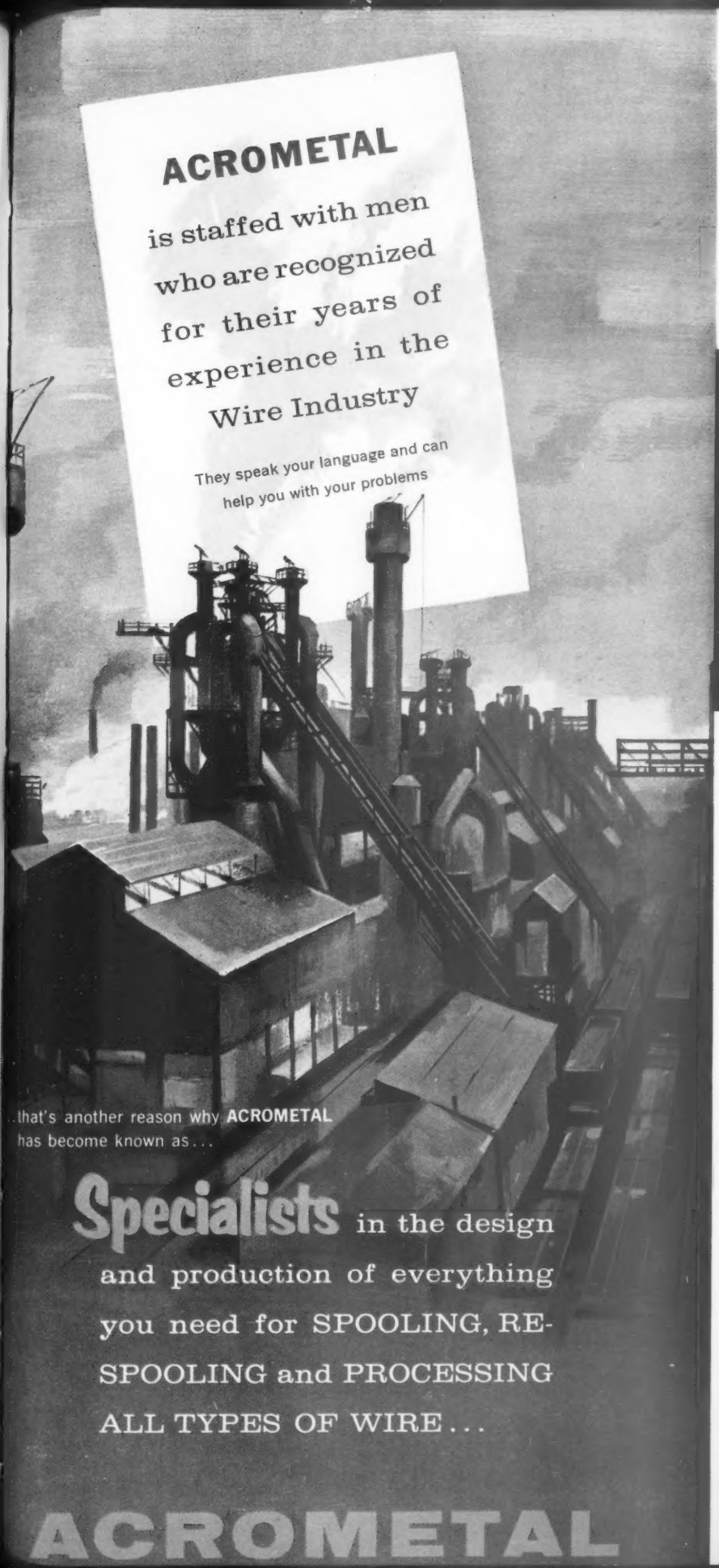


Fig. 4 — Photograph at 10x magnification of a 5g rod with a very deep surface crack on one side only. The crack did not become visible until the sample was etched in hot acid. * *

The angle of penetration of the crack into the rod can vary considerably, in some cases being al-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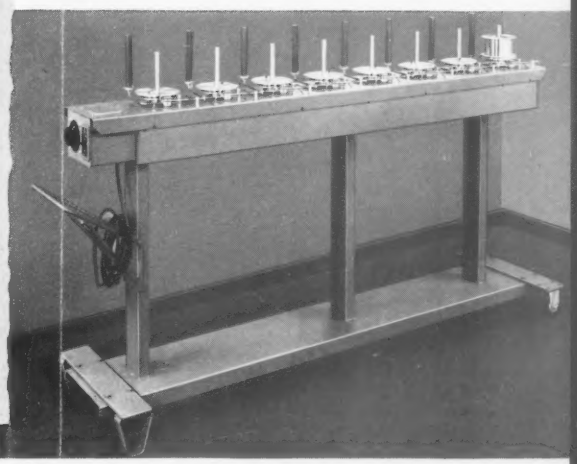

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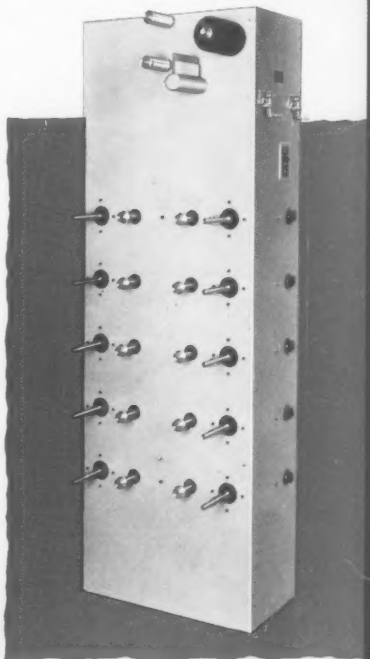

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most at right angles to the surface and in others penetrating at a very shallow angle giving a thin knife-like lap.

* * *

Surface cracks can persist through many wire-drawing passes without revealing their presence excepting in the cases of the shallow angle cracks where fragments of the thin lap can tend to crumble away and seize in the die entrance, or on occasions where hard fragments of mill-scale trapped beneath the surface skin interfere with grain deformation and cause wire breakage. The surface cracks which do withstand the drawing process can be the cause of rejections during inspection of the drawn wire, particularly during torsion, reverse bend, or wrap testing, when the wire surface is subjected to severe stress, tending to tear at any weak spot such as the remains of a seam or lap.

* * *

It is considered in certain quarters that any serious surface fault must of necessity cause wire failure during the first few drawing passes and that any material which survives through 7 or 8 dies must be perfectly sound. This is quite a mistaken view and many instances have occurred where steel or rod-rolling defects have persisted into a third stage drawing and given trouble on wires in the 25 to 30 gauge range. The financial loss incurred on these occasions bears no comparison with the weight of material involved and a rod inspection system can more than pay for itself in reducing troubles of this nature to the lowest possible level.

Structural Defects

In the last main heading are grouped coarse grain and excessive decarburisation. As with inclusions mentioned previously, grain size and decarburisation are not truly revealed by the rapid routine tests normally applied to incoming raw materials and accurate assessment entails the examination of prepared samples under the microscope. (It is possible to gain a very rough idea of grain size from the routine tests but this will be mentioned in more detail later).

* * *

Grain size and decarburisation are, however, factors which must be borne in mind, particularly where the green rod is to be ripped down to an intermediate wire inlet size prior to patenting, or where a customer's specification limits the permissible depth of decarburisation.

* * *

Excessive soaking in the billet heating furnace or completion of rolling at too high a temperature can result in both the growth of massive crystals with wide, weak grain boundaries (Figure 5) and also the formation of a heavily decarburised skin; the latter fault is of course extremely undesirable in any material destined for spring wire production where the decarburised layer adversely affects the fatigue properties of the formed spring.

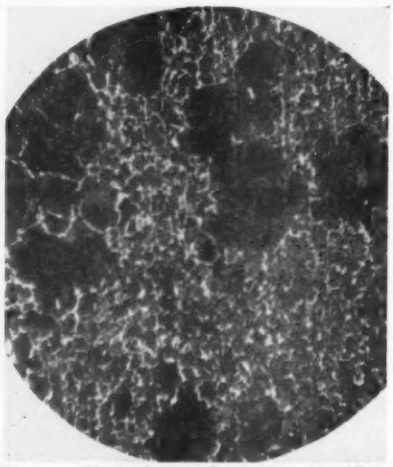


Fig. 5 — Photomicrograph at 100x magnification showing the structure of a 5g 0.58% Carbon Steel Rod in the "green" unpatented condition. The grain size is very irregular and there is an extensive well defined net-work of free ferrite in the grain boundaries. * *

Medium carbon steels of 0.3—0.5% Carbon content are more liable to possess an extensive network of free ferrite in the grain boundaries than the higher carbon steels and yet it is often desired to give greater reductions from the green rod with these qualities, prior to patenting at an intermediate wire size.

* * *

Perhaps the next few years will see the greater use of controlled cooling between final rolling stand and the coilers so that the wire rod, even if not given a fully patented structure, will possess a reasonably fine grain without any extensive ferrite network.

Inspection Technique

To be fully effective, and to obtain the maximum benefit from rod quality control, testing of incoming raw material must be carried out in close collaboration with Production Management and Stores Control and all efforts must be made to sample, test and report on all batches of rod as soon as possible after receipt.

* * *

It is suggested that at least 10% of each consignment be examined, to give a general guide to the quality of the cast and enable a decision to be made as to the type of wire to be produced from it. Over a period of time a clear picture is formed of the standard of material obtained from the different suppliers and any improvement or deterioration in rod quality is quickly revealed.

* * *

In sampling of routine 10% batches it has been found unnecessary to insist on both ends of each sampled coil being obtained. It is quite satisfactory to crop ends at random whilst the coils are being unloaded from the wagons and not to take up any undue amount of time searching for the elusive end which has been tucked out of sight in the coil. By streamlining sampling in this way, and also by discontinuing the practise of numbering the sampled coils, the time taken in sampling and testing these batches is almost halved.

* * *

Where material is to be converted from commercial quality to A.I.D. or other Government Standards it is necessary to examine samples taken from the front and back end of every coil in the consignment. The coils must be clearly numbered and the identity of the samples preserved throughout preparation and inspection, so that the numbered coils can be separated later into batches of different qualities.

* * *

A similar form of 100% testing can be profitably applied to all material which is eventually to be drawn to very fine wire sizes, where the loss of production result-

ing from efforts to cope with the 4 cwts of wire inlet from just one unsuitable coil of hot-rolled rod can be more costly than the examination of many tons of incoming raw material.

Sampling

The samples cut from coils are normally about 4 inches long and a visual check is made at this stage to ensure that the sample is not obviously misshapen but can be taken as representative of the coil. If the end is badly formed, sufficient material is removed from the coil to permit the cutting of a fair sample. This operation should be unnecessary if the Rod-Roller is shearing correctly during and after rolling.

* * *

The samples can be held in numbered blocks, each sample fitting into a separate 'pigeon hole' for easy identification, the blocks must be stable when full of cropped samples to reduce the risk of overbalancing and mixing the ends.

* * *

After cropping, the ends of the samples must be prepared for the test proper by removing the material which has been bruised by the rod croppers. This end preparation can be done by hand filing if necessary, but the task is extremely tedious and when any number of samples are to be prepared, a power grinder is indispensible. Either an abrasive belt or a wheel can be used successfully, the belts require to be replaced at regular intervals and the stone requires dressing periodically so that choice must be left to the user. Whichever method is adopted a rigid support is required, on which to rest the sample, mounted as close to the face of the abrasive as possible to avoid any risk of the sample jamming in the space between the two. It is also recommended that the samples be held in some form of quick-grip pliers during the grinding operation and not held directly in the hand. This may take slightly longer but it does permit positive control of the samples and reduces the risk of accidents to the minimum. Eye protection is of course just as essential during sample grinding as in any standard engineering application of grinding equipment.

With both the belt and wheel grinder, provision must be made for the removal of the steel particles produced during the grinding operation which would otherwise make the atmosphere objectionable in a very short space of time, soiling clothes and equipment and also making the use of a respirator essential. Dust suppression can be accomplished either by using a wet grinding technique or by having a positive extraction system which exhausts the particles from the source. The wet process is probably the better of the two, although it may tend to be rather messy; in the air extraction system the dry particles tend to weld together and build up inside ducting, which must be stripped at surprisingly frequent intervals for cleaning purposes.

* * *

The samples must be ground with ends truly at right angles so that the samples will stand on end without danger of falling over.

* * *

After grinding the length of the samples can be cropped down to approximately 1″ in the case of routine samples which are to be sulphur printed and deep etched, or 3″ where the samples are to be deep etched only and the samples retained for A.I.D. inspection.

Sulphur Printing

The sulphur print can reveal sulphur segregation only and gives no indication of the presence of any surface flaws; it does however give a permanent, easily filed record, and can be performed quite quickly.

* * *

The test depends upon the reaction between dilute sulphuric acid and the sulphur bearing compounds in the steel, evolving hydrogen sulphide. The liberated hydrogen sulphide reacts with the silver chloride in the photographic paper used for the test, forming a brown silver sulphide image.

* * *

In performing the test a small slip of photographic contact print paper is soaked for several minutes in 2% sulphuric acid and then placed emulsion side up on a flat sheet of glass and the 1″ long rod samples are stood with their prepared ends in contact with the paper.

* * *

After two minutes the steel samples are removed and the paper is rinsed in running water, immersed in high-speed photographic fixing solution for two minutes, washed for 15 minutes and finally dried. (As the sulphur print is a chemical print and not a photographic print, all these operations can be carried out in daylight).

* * *

A brown image of each sample end is formed on the paper, variation in distribution of sulphur in the steel being revealed as a variation in density of the brown image, a region of axial sulphur segregation showing up as a tell-tale dark brown or black spot in the centre of the print. (Figure 6).

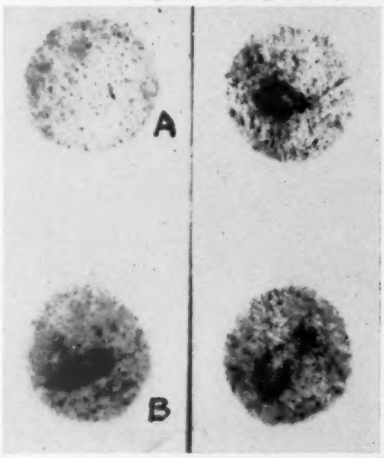


Fig. 6 — Photograph at 4x magnification of four sulphur prints from 5g rods. Print A is of sound material, the remaining three prints show the presence of segregation. * *

Deep Etch Test

After the sulphur print test is completed the steel samples can be used for the deep-etch test without any further preparation.

* * *

In order to retain the identity of the samples and yet permit more than one sample to be tested at any one time, the lengths of rod are pushed through pierced strips of rubber and deep-etched in batches of up to 12 samples at once.

* * *

The batches of ends are immersed for 10 minutes in a solution of 1 part concentrated Hydrochloric Acid and 1 part water,

heated to not less than 85°C. As the acid reacts vigorously with the samples, evolving hydrogen and acid fumes, the etching process should be carried out in a Laboratory Type Fume Cupboard. After etching the samples are washed in hot water and dried in a current of warm air.

* * *

During the etching treatment the surface layer of mill-scale is dissolved and any surface imperfections such as seams and laps are opened up and rendered visible. In addition any irregularities in composition of the steel are shown up as by variation in the rate of attack of the acid on the steel. Axial segregation in a rod will be shown as a shallow hole in the end of the etched sample. (Figure 7).

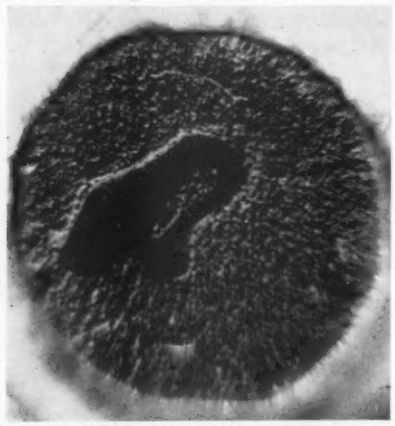


Fig. 7 — Photograph at 10x magnification of a deep-etched sample of 5g material with a region of sulphur segregation etched out deeply. This sample is the same one used for sulphur print B in Figure 6. * * * * *

As this test does reveal both segregation and surface cracks it can be used either alone or in conjunction with the sulphur print test. In the cases where it is necessary to use a 3″ sample for the deep etch test, for A.I.D. conversion purposes, the rod ends are too long for convenient handling in sulphur printing and therefore the deep etch test only is used and the etched samples from the A.I.D. quality material are retained for at least six months as a record of the test.

* * *

As mentioned earlier, it is possible to get a very rough idea of the grain size of the material from the appearance of the etched ends. There is, however, a considerable difference between the rate of attack of new and of near-spent acid, giving an apparent difference in roughness of the etched ends which could be interpreted as a difference in grain size. An experienced tester should be able to spot a material having a very coarse grain and which should be given a preparatory heat-treatment prior to roughing down to an intermediate wire inlet size.

Interpretation of Results

It is extremely difficult to lay down any hard and fast rules as to interpretation of test results. Perfect samples do not of course present any problem, nor do samples from rods which are obviously unsuitable for any drawing whatsoever. It is the sample which is not quite perfect, and yet not sufficiently bad to discard, which presents the problem. It is necessary for each inspection organization to derive its own limits over a period of time. There must be some slight variation in acceptance limits depending upon the type of steel involved, the wire-drawing production methods and the intended use of the finished wire.

* * *

As the checking must be done in the main by visual interpretation rather than by actual measurement, it is of vital importance to maintain continuity in the inspection team. Any new member of staff must work in close collaboration with an "old-hand" until knowledge of the appropriate standards has been acquired.

* * *

In a short period of time the inspection personnel, with the cooperation of the Production Management, can equip themselves with the knowledge permitting satisfactory allocation of all grades of material. Experience will quickly show which fine surface flaws will have no harmful effect on the finished wire and which faults, either surface or steel defects, warrant an approach to the rod supplier.

* * *

In actual practise it is possible to separate raw material into four or five usable grades, ranging from rods suitable for drawing to ultra-fine wires through to rods which should be used for producing only thick wire to relatively easy specifications; faulty rods which cannot be so graded must of course be rejected.

* * *

On completion of the tests a report is submitted to Production Management with a duplicate to Stores Stock Control. In the case of 10% tests the report indicates only the general quality of the consignment and what drawing distance would be suitable. In the case of 100% tests a more detailed report is given showing the number of coils allocated to each of the two or more grades considered. The labels which were attached to the coils during sampling are now marked with a code letter indicating the coil grade and as soon as possible the coils are sorted into stacks of the separate grades.

* * *

Types of Failure in Drawing.

Although Rod Inspection will reduce troubles in drawing to the lowest possible level there will still be the isolated instance of failure where a fault is of a localised or intermittent nature only and is not revealed by examination of the ends of the coil. It is of assistance on these occasions if the cause of failure can be established with a fair measure of certainty by examination on the spot, in addition to submitting samples for Laboratory examination.

* * *

Severe segregation often gives rise to a cup and cone type of fracture (Figure 8) due to structural failure commencing at the centre and gradually extending outwards toward the surface. As a similar type of break can occur due to incorrect heat treatment or incorrect die angles, it is essential to confirm the presence or absence of segregation in these cases.

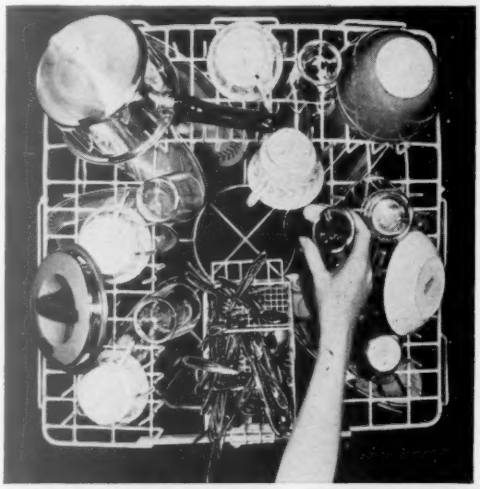
* * *

Surface defects can give rise to several types of failure. Long slivers of material may tear away from a shallow lap (Figure 9) or a V notch may develop on the surface where the lap starts to crumble, increasing in magnitude as drawing proceeds until complete failure occurs (Figure 10). A badly finned rod may develop a series of cracks

(*Please turn to page* 654)

DSC-Portsmouth 3000 lb. LPR® Coils help boost production on General Electric Dishwasher Racks with 5-Year Job-Performance Score—99.595%

Mr. J. P. Mapother, Buyer, G.E. Dishwasher Dept., Louisville, Ky., reports "No problems whatsoever" since 1956 change-over from 300 lb. bundles to 3000 lb. LPR's



PHOTOS COURTESY G.E. DISHWASHER DEPT., LOUISVILLE, KY.

FACTS OF THE JOB — **Performance Period:** from 1956 through March, 1961. **Wire Grade:** DSC-Portsmouth Brite Wire; **Wire Sizes:** .1055"-.1875"; **Non-Stop Fabricating per 3000 lb. Coil:** for .1055"—19 miles, for .1205"—14 miles, for .1875"—6 miles; **Operations:** high-speed forming, welding, plastisol (vinyl-type) coating.

HISTORY OF THE JOB — Prior to 1956, brite wire for dishwasher rack production had been purchased in 300 lb. bundles. Came January 1956, it was decided that short-run bundles would nullify the production advantages of the new, high-speed forming and welding machinery recently installed and then ready for operation. A meeting with DSC wire people resulted in the approval and purchase of 3000 lb. LPR's.

CUSTOMER DESCRIBES LPR BENEFITS — With the 5-year Job-Performance score in the record, we asked Mr. Mapother how his plant people felt about LPR's. Summing up their experience, he remarked, "No problems whatsoever." More specifically he referred to the following advantages of LPR's as compared with the short-run bundles: **90% reduction in downtime due to coil changes and setup adjustments; savings of at least 90% in coil remnant scrap; increase in productivity estimated in direct relation to savings in downtime and scrap.** Among other benefits observed: **unloading time cut in half; small coil racks dispensed with; inventory management simplified and improved.**

The plant engineer credited DSC wire people for technical suggestions which helped eliminate wire tangling in feeding, "solving a difficult labor problem" caused previously by interruptions in production flow.

Get all the cost-saving facts on LPR's from your nearest DSC Customer "Rep" or write direct: Detroit Steel Corporation, Box 7508, Detroit 9, Mich.

Customer Satisfaction—Our No. 1 Job

Customer "REP" Offices in Principal Cities

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Steel — The Bargain Wonder Metal

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Flat Rolled and Wire Products

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Cable Address DETROSTEEL—New York

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Parallel Paths of Progress for Aluminum and Electrical Industries

This year marks the 75th Anniversary of aluminum's commercial production, for which occasion The Aluminum Association has supplied this background information on this versatile light metal in its electrical applications.

Thomas A. Edison opened America's first commercial power station in 1882 providing power for a few flickering amber lights and ushering in the era of electricity. Just four years later, **Charles Martin Hall** turned to electricity for the most efficient means of obtaining aluminum. Since that time the fortunes of the two industries have grown hand in hand.

* * *

Aluminum is both a consumer of and a supplier to the electrical industry. Electric energy, essential in the aluminum reduction process, represents some 20 per cent of its finished cost. The cost and proximity of electric energy has long been an important factor in the growth of the aluminum industry.

* * *

Aluminum in the 75 years since Hall's discovery also has established its value to the electrical industry. Applications for current-carrying capacity were among the first users of aluminum, and now the electrical industry depends heavily on aluminum products to transmit electricity from generating stations to widely scattered customers. Electrical applications rank third in the use of aluminum semi-fabricated products according to Aluminum Association reports.

* * *

The reduction of aluminum requires about 8½ kilowatt-hours of electricity for every pound of metal. Most of this energy is used in the electrolytic reduction of aluminum from its oxide, with only a small percentage used to drive mechanical equipment and to light, heat and control the plant.

* * *

Electric power in the aluminum industry's first plant in Pittsburgh was supplied by two Edison bipolar d-c generators, each rated at 1,000 amperes at 25 volts. They were driven by a single 125-horsepower steam engine, served by two gas-fired boilers. When the plant was enlarged in 1890, two generators having a capacity of 2,500 amperes at 50 volts were installed.

* * *

When the Niagara Falls hydroelectric development was begun in 1895, the aluminum industry contracted for 1,500 horsepower. From that point until World War II, all aluminum reduction plants were built near large hydroelectric installations. Today's aluminum reduction plants depend not only on hydroelectric power but on coal-and-gas-fired generating equipment.

* * *

Aluminum's extensive usage in the electrical industry stems primarily from its high electrical conductivity. This is, on a volume basis, 62% that of copper, but on a weight basis is more than twice that of copper. Along with economy, light weight, high resistance to corrosion, workability and other features of aluminum have led to further use.

* * *

An aluminum bus bar installed in 1895 in the original Niagara Falls reduction works is said to be the first application of the metal for electric current-carrying purposes. In 1897 a half-mile of No. 11 aluminum telephone wire was erected in the Chicago stockyards, where locomotive gases corroded copper wire in a short time.

* * *

The first use of aluminum transmission cable was on a 46-mile three-phase line from Blue Lakes to Stockton, California, which was erected in 1898. Large scale use of aluminum transmission cable did not begin, however, until some years later, after the invention of the steel reinforced conductor, now commonly known as ACSR. Over 80% of all transmission lines erected over the last 20 years use conductors of this type.

* * *

ACSR has a core of high-carbon steel wire to carry most of the mechanical load, while the wires of high-conductivity aluminum stranded around the steel core carry most of the electric current. The proportion of aluminum to steel in the cable varies with the circumstances. For particularly long spans, such as river or valley crossings, the cable may contain as much or more steel than aluminum. Normally, however, the ratio of aluminum to steel is about 9 to 1 on a volume basis.

* * *

Generally speaking, ACSR is about 50% stronger and 20% lighter than equivalent copper conductor. As a result, spans between towers or poles can be longer and allowable sags flatter when ACSR is used. Moreover, the lighter weight of ACSR facilitates erection, particularly in mountainous country as well as permitting longer spans.

* * *

One of the fastest growing utility uses of aluminum conductors is in distribution lines, service drops and service cable. It is rapidly approaching the point of dominance held by ACSR in transmission lines.

* * *

Aluminum-sheathed cables (underground, overhead and submarine) have been introduced successfully in England and Germany, replacing lead-sheathed cables. Since aluminum weighs only 24% as much as lead, and since the greater strength of aluminum permits a decrease in wall thickness by 25 to 30%, very high weight reductions can be achieved in the sheathing.

* * *

Weight savings up to 65% have been reported for unarmored aluminum-sheathed cable; for armored

cable, the savings amount to about 40%. The higher strength of aluminum sheathing, even with reduced wall thickness, allows lighter armoring and, in some cases, elimination of the armor.

* * *

Important economic advantages have been obtained by using extruded aluminum alloy bus. Experience has shown that substitution of a slightly larger aluminum bus bar can be made instead of copper, with no loss of short-circuit strength.

* * *

In the construction of substations and transmission towers, aluminum in the form of extruded or rolled structural shapes and tube often offers cost advantages over steel, if decreased erection and maintenance costs of aluminum structure are taken into account. The economy of aluminum construction is particularly evident in locations where contaminated industrial atmospheres such as sulfur and corrosive gases attack galvanized steel structures severely and necessitate repainting every few years. Similarly, great advantages exist where towers are to be erected in remote locations.

* * *

Transmission towers built from aluminum tube and rolled or extruded shapes have been installed at a number of locations and have proven economical. Such towers can be designed to weigh less than 50% of steel towers of equal strength. While the original material cost of an all-aluminum tower is higher than that of a galvanized steel tower, the ultimate cost of the aluminum tower in many areas is lower than that of the steel tower because of economies in erection and maintenance.

* * *

Transmission towers and conductors of the future, capable of spanning the country with a grid of extra-high-voltage lines, are being tested at several sites in the U.S. Aluminum is playing a large part in this program and at each of the test locations, aluminum structures and conductors are meeting the needs of these higher power levels.

* * *

Aluminum has experienced amazing growth in the rigid conduit field over the last three years. Aluminum's corrosion resistance is superior to that of the steel conduit it replaces, and the economies afforded in handling, forming and bending are real advantages. Better grounding can be made with aluminum installations and the non-sparking quality is an important factor in explosive atmospheres.

* * *

Aluminum building wire is fully recognized by the National Electrical Code and other authorities, and its use has expanded greatly in the last ten years. Practices for installing insulated aluminum conductor are accepted as standard in the building trades.

* * *

Aluminum fittings and connectors have extremely wide applications. The light metal is also being used in pole line hardware; recently suspension insulators for power lines have appeared with aluminum caps which reduce the weight of the insulators appreciably.

* * *

A host of other applications have been successfully introduced in the electric power industry. Aluminum has been used successfully in high-voltage switches, assembled switches, reactors, regulators, transformers. The first large power transformer in which all parts except the core were aluminum appeared about two years ago and prototypes of small distribution transformers have been developed.

* * *

Cast aluminum rotors for induction motors have become increasingly popular, and this application is being extended to an expanding range of motor sizes. In this application the rotor bars and cooling fans often are cast in one piece. Cast aluminum end bells for motors grew up during the war and expanded during the postwar shortage of other metals.

* * *

Aluminum magnet wire in a broad range of sizes was made available about two years ago. Previously, all magnet wire was made of copper. Manufacturing problems concerning the adaptability of coil-winding machines to aluminum winding and uncertainty of joining methods have been overcome, and aluminum magnet wire is expected to have wide acceptance.

* * *

Lamp shells of aluminum are becoming quite common, and some types of bulbs are manufactured with no other base material. Fluorescent bulbs and flash bulbs fall into this category, and experimentation with aluminum bases for threaded incandescent lamps has produced a satisfactory product that has won consumer acceptance.

* * *

Aluminum parts are found as major components of vacuum cleaners, mixers, washing machines, sewing machines, refrigerators, electric irons and hot plates and many others. In some of these uses, customer acceptance has been so complete that no other material is used.

* * *

Aluminum first was used in turbine generators over thirty years ago, when a number of generators were built in Germany with aluminum field windings. In modern units, aluminum is used as an electric conductor, as a structural material, or where nonmagnetic considerations are important. It also has been used for generator terminal plates and axial-flow fans.

* * *

Both current-carrying and non-current-carrying parts of relays and power circuit breakers are being made of aluminum. In these units, the low inertia of the metal contributes to higher operating speeds, an important consideration in many cases. The same considerations have led to the use of aluminum in the electrode arms of spot-welding machines. Die-cast aluminum meter cases have become standard.

* * *

Aluminum's nonmagnetic characteristics have led to its extensive use for electrical shielding. During World War II, cases for radar and other electronic equipment were made of aluminum. Now many radio manufacturers are building sets with aluminum chassis.

* * *

Aluminum will continue to be

(*Please turn to page* 656)

Simultaneous Extrusion of Polyethylene and Polyvinyl Chloride Coatings on Electrical Conductors

by G. E. Henning
Western Electric Company
Baltimore Works
Baltimore, Maryland

The author wishes to acknowledge active participation in the design and development of the Multicoat Extrusion Facilities of M. W. Richter, Development Engineer, Cable. The author also wishes at this time to thank many other individuals, both in and outside of the Western Electric Company, who directly and indirectly offered suggestions that were helpful in the design and development of the equipment.

This paper was presented at the Ninth Annual Symposium on Technical Progress in Communication Wires and Cables held at Asbury Park, N. J., November 30-December 2, 1960, under the auspices of the U. S. Army Research and Development Laboratory, Fort Monmouth, N. J.

The Baltimore Works of the Western Electric Company has been manufacturing a polyethylene insulated and polyvinyl chloride jacketed conductor, for which the demand has increased greatly since its first full year of use in 1954. This conductor, shown schematically in cross section in Fig. I is used interchangeably in our D and E-Rural Wires. As many of you

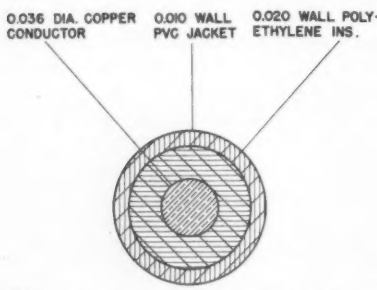


FIG. I

know, D-Rural wire consists of 6 pairs of insulated and jacketed 19 gauge copper conductor stranded about a polyethylene insulated .109″ high strength steel support wire; the E-Rural wire consists of 12 pairs of insulated and jacketed 19 gauge copper conductor stranded about a polyethylene insulated .120″ high strength steel support wire.

* * *

Our old method of insulating and jacketing this conductor is shown in Fig. II. One of the two lines shown was employed for strand annealing 19 gauge hard copper wire and insulating it with a 20 mil wall of black weather-resistant polyethylene. This line is also used for insulating the support wire. The other line was used exclusively for jacketing or coating the 19 gauge polyethylene insulated conductor with a tough, weather-resistant, colored polyvinyl chloride or PVC. To insure continuous operation during jacketing, it was necessary to exercise fairly close diameter control of the insulated wire. This feature, plus extra handling of reels and maintenance of equipment soon made it obvious that a better method of manufacture should be devised.

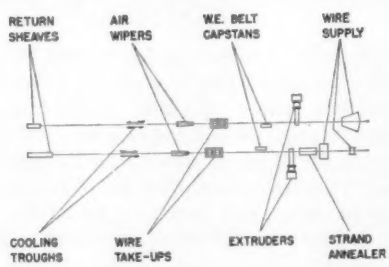


FIG. II

* * *

One of the first ideas for improving manufacture was to operate the two existing lines in tandem. This, of course, was feasible but careful analysis indicated that it would not have been ideal and was, therefore, never tried.

* * *

We experimented by attaching a 1½″ extruder to an existing 3¼″ extruder to determine whether the polyethylene and PVC coatings could be applied simultaneously in a common tool and head assembly. The experimental arrangement is shown schematically in Fig. III. Because of existing

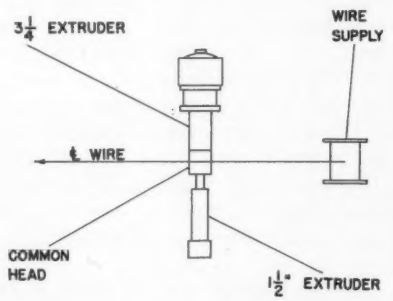


FIG. III

drive limitations it was necessary to peg the coating speed at 175 FPM. However, results appeared so promising that we decided to proceed with two new 3½″ (16:1-L/D Ratio) commercial extruders mounted on a common base and arranged to discharge the polyethylene and PVC plastics into a common head.

* * *

Many different arrangements for placing the extruders were considered. We finally decided on a design in which each extruder cylinder was disposed at a relatively small angle to a vertical plane perpendicular to another vertical plane passing through the line of wire travel. (See Fig. IV). This principle was retained although we did change the position of the tool capsule with respect to the two extruder cylinders.

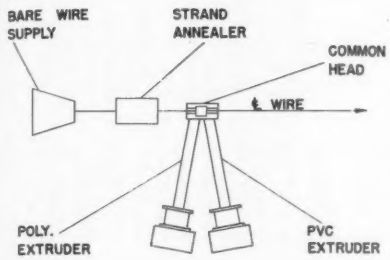


FIG. IV . . . . . .

Our first specification to the extruder suppliers called for a tool capsule mounted between the extruder cylinders as shown in Fig. V. This design has the advantage

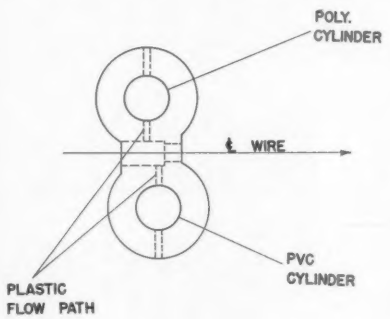


FIG. V . . . . . .

of providing a short flow path from each cylinder to the tool capsule. This is an important consideration when coating wire with heat sensitive PVC compounds and long runs between clean-outs are desired. Negotiations with extruder builders interested in the project led us to believe that a less costly machine would result if the axes of both extruder cylinders were in the same horizontal plane. A schematic of the common head for this design is shown in Fig. VI. The

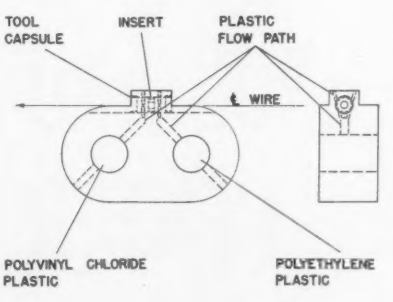


FIG. VI . . . . . .

plastic flow path in this design is approximately 1.3 times as long as that shown in Fig. V. We felt that this was still a safe ratio for heat sensitive PVC compounds. Other design features, particularly the fixed head principle, which will be described later, were also simplified, so we proceeded to design the machine around this head.

* * *

The basic features of the common head will be described at this point. It will be noted that the tool capsule is placed equidistantly from the top side of the two angular disposed extruder cylinders. Plastic passes from each cylinder through a single port located between the screen pack and the cylinder clean out nut. Viewing the tool capsule bore from the wire entering side, it will be noted that the polyethylene plastic from the single port divides into two smaller streams which enter tangentially to the capsule bore forming the tool chamber. A similar arrangement also exists for the PVC plastic on the wire exit side. Between the chambers for the two plastics a hardened threaded insert is placed which serves also to center the polyethylene die within the tool chamber. This removable insert can readily be replaced in event of damage to the plastic sealing surface. It also permits rather extensive changes in tool design should new materials require such a step.

* * *

The polyethylene die serves as the register member for the other tool components; namely, the diamond core tube through which the 19 gauge copper conductor enters and the PVC die which applies the final jacket coating. These details are housed in separate hardened and ground threaded members which act to positively seal the plastics in their respective compartments. They also allow the plastic to feed into the dies through a unique spider arrangement which serves to hold the tool members in close concentric alignment.

* * *

The plastic pressures for our operation are approximately 5000 psi for the polyethylene and 2500 psi for the PVC for a discharge rate for the two coatings of approximately 112 cu. in./min. These pressures are measured between the screen pack and the cylinder clean out nut before the plastic enters the ports to the tool compartments. The pressures indicated above can be varied substantially by changes in the tool design. Since we use so called throttling type tools, any attempt to open the valve to reduce the pressure would affect the concentricity of the plastic coatings.

* * *

The holes forming the plastic flow channel or port from the cylinder to the tool capsule extend to the underside of the common head where pressure measuring devices can be mounted. Blowout diaphragms to guard against excessive pressures may also be mounted at these points. A hole is also provided in each cylinder clean out plug which can be used for similar purposes. We have found these features helpful in proving in new tool designs. Once optimum conditions have been established, the above devices can, if desired, be replaced with solid plugs.

* * *

The common head is fastened to a fixed pedestal, which is rigidly mounted to the common base. A member having relatively low heat conductivity is placed between the pad on the bottom of the common head and the fixed pedestal. Each cylinder is screwed into the common head and is free to move independently along its axis under the effect of thermal expansion. In so doing it also moves the gear reduction unit. This is accomplished by mounting each gear reduction unit to a sub-base which is connected to the common or fixed main base by means of a gib and ways. Since the two plastic operating temperatures differ by approximately 100°F., the total thermal expansion is different for each extruder cylinder; approximately 5/32″ for the polyethylene and 1/8″ for the PVC.

* * *

The main motor drives are also rigidly fixed and are connected to each reduction gear by means of a jack shaft and flexible coupling. This arrangement is shown in Fig. VII. Since the couplings were aligned when the extruders were at operating temperature, there is no objectionable vibration of the reduction gear units under

A CLARK EXCLUSIVE ...SPOOLS FOR INSULATED WIRE & CABLE WITH A CONTINUOUS LOCK SEAL BETWEEN ENDS AND CENTER

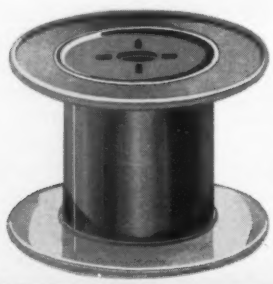
New Clark Single-Center Nonreturnable Fine Wire Spools

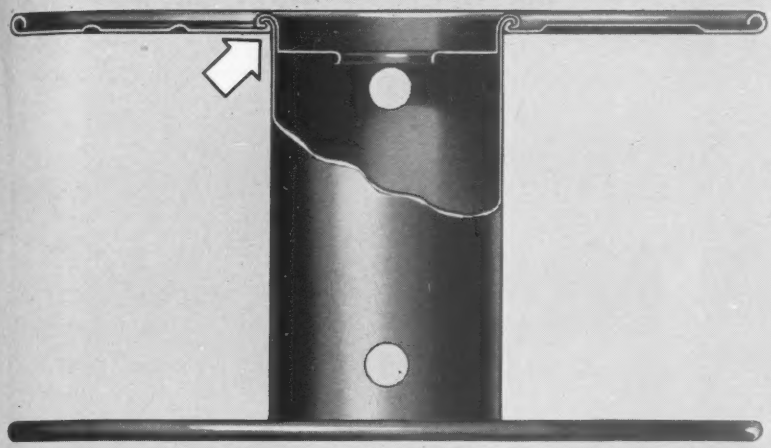
The latest addition to the Clark line of wire packaging products is a new single-center fine wire spool with a 3½″ diameter center and 6″ diameter ends. Lighter in weight and costing far less than many conventional heavy-duty types, this new spool offers new opportunities to fine wire manufacturers for cutting packaging and shipping costs, as well as providing the ideal nonbreakable package for other heavy-duty applications.

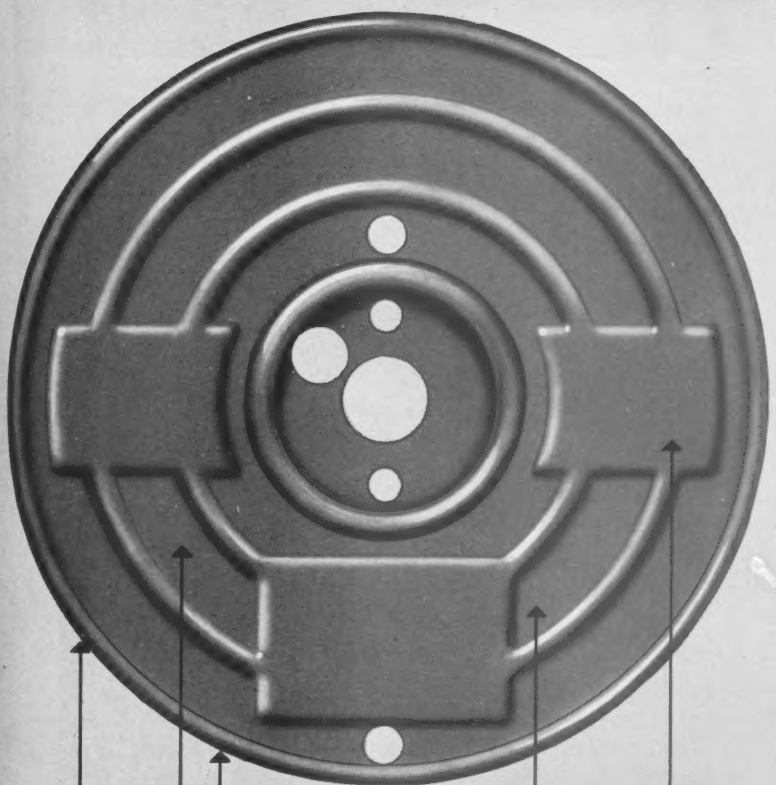
Although weight has been reduced appreciably, there has been no sacrifice of strength and rigidity. This spool is unbreakable in normal usage.

Extra costsavings are also possible, since this new Clark spool is designed for use on nonreturnable basis, eliminating the need for expensive deposit credit bookkeeping.

Write, wire or phone today for further information and samples of this latest product of creative spool engineering and precision manufacturing at Clark.







Edges of Clark spool ends are fully curled to prevent snagging and damage to wire or insulation.

Clark spools can be shipped with ends and centers packed separately to save space. Assembly is simple and rapid with a hand arbor, foot or power press.

The outside of spool ends is coated with a finish which permits extra rubber-stamping of special information by you or your customers.

Ribs are available with and without identification panels. Special arbor and drive holes can be incorporated to meet requirements of your winding machines.

End diameters available are 3-3/4", 5", 6-1/2", and 10-1/2" with 1-15/16" dia. center. A 3-1/2" dia. center is also offered with a 10-1/2" dia. end. A special 16-1/2" dia. end can be ordered with a 5" center. Centers from 1" to 13-1/2", depending on type, size, and capacity.

As final protection for the inside of spool ends and outside of centers, Clark applies a high-bake phenolic coating impervious to lacquers used to protect insulation.

For insulated wire and cable, or for fine wire requirements, the sturdiest and most effective package you can buy is an all-metal spool, custom engineered by J. L. Clark. One important reason: an ingenious locking operation which insures a continuous, reinforced bond between the center and ends, leaving no raw edges exposed to snag or cut. This sturdy locked seam guarantees center rigidity and secure assembly, making the Clark spool one of the strongest on the market today.

Clark spools can be assembled twice as fast as other spools!

Center and ends are joined in your plant by a simple hand arbor, kick or power press operation, since there is no alignment or indexing of parts necessary. Assembling tools and kick presses are available from Clark at nominal cost to users of these spools.

As part of Clark's integrated spool service to customers throughout the country, we offer complete facilities for creative design and graphic styling, assuring instant identification of your brand and product. Award-winning metal lithography by Clark provides distinctive eye appeal in addition to complete product protection.

Whatever your spool requirements—insulated wire, cable, solder, enameled wire, or fine wire—you can rely on Clark spools for superior performance. A Clark representative will be glad to discuss your specific requirements with you. You will find him helpful and capable of offering constructive suggestions on how you can get maximum value for your spool dollar.

Clark spools are still the standard by which all others are judged.

J. L. CLARK

J. L. Clark Manufacturing Co.
Rockford, Ill.; Liberty Division Plant and Sales, Lancaster, Pa.; New York Sales Office, Chrysler Bldg., N. Y. 17

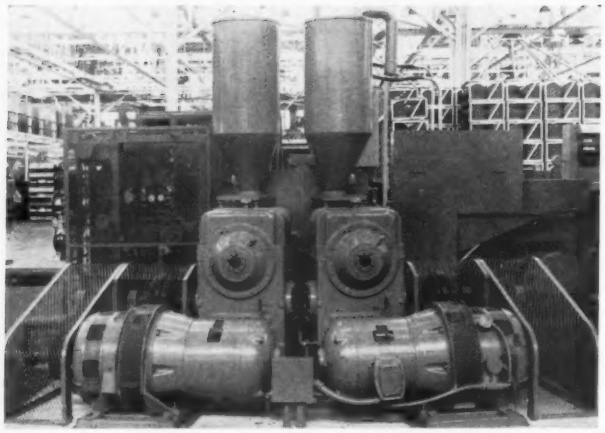


Fig. 7

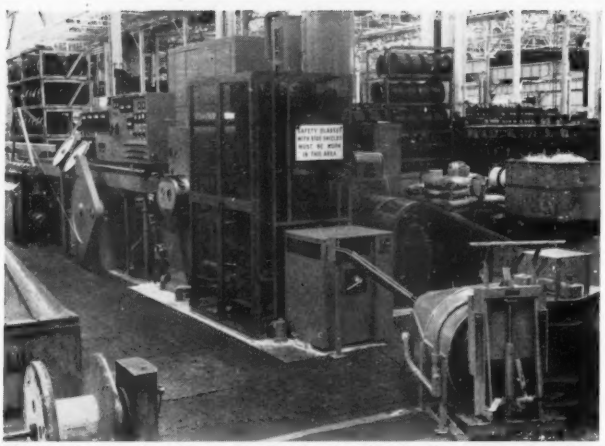


Fig. 8

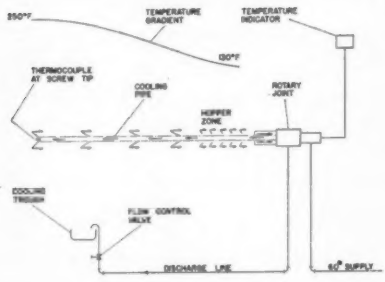


FIG. 7(A)

full load conditions. The couplings used are guaranteed by their manufacturer to transmit full rated torque when 1/8″ out of alignment. Actually, vibration is also negligible when the reduction gears are operated with the extruders cold, when the coupling misalignment on the polyethylene extruder actually exceeds the 1/8″ mentioned.

* * *

The extruders used for this application were ordered without the usual air cooling, currently provided by most manufacturers. To control the plastic temperatures and guard against scorching heat sensitive PVC compounds, water cooling was provided for the extrusion screws—see Fig. 7 (A). The method used consists in bringing water under 60 pounds line pressure into the screw. Actual flow through the screw is regulated by means of a manually operated flow control valve in the discharge line. Since the total flow is only about 1/2 gallon per minute, the pressure within the screw is close to 60 psi. The cooling pipe through which the water must flow to reach the screw bore has holes drilled in its wall so that a portion of the flow in the vicinity of the hopper zone is at this point returned to the discharge line. At spaced intervals along the screw more of the cooling water is returned to the discharge line and a small portion of the flow is sent to the tip of the screw so that the temperature in this area can be maintained at 250°F. or higher if desired. This temperature is indicated on the operator's control panel and is the only guide he needs to let him know that the screw cooling temperature is under control.

* * *

By a judicious drilling of the inner cooling pipe it is possible to maintain any desired temperature gradient within the screw. A simple thermocouple or thermometer extending forward to the tip of the screw is all that is needed to indicate the water cooling temperature in this area which, insofar as the extrusion operation is concerned, is also the most critical area. This system has been in use on some applications at Western for over eight years with outstanding results. When first introduced, completely automatic temperature control systems were employed which proved entirely satisfactory except that some maintenance was required. As further information was acquired on how various screw designs responded when the water cooling characterisics were changed, it became apparent that little, if anything, could be gained from a completely automatic system. Once operation is underway an occasional glance at the screw tip temperature is all that is needed on the part of the operator. Our operators apparently value this device very highly since they know that a minimum amount of attention on their part will net them many hours of additional operation on heat sensitive PVC compounds.

* * *

To facilitate manufacture the Baltimore Works does not water cool extrusion screws used in conventional polyethylene wire coating applications. However there is evidence that size control and surface finish are improved on some types of polyethylenes when screw water cooling is used, especially on extruders having relatively low L/D ratios. The tendency for product to run rough when too large a screw thread depth is used for small gage thin wall polyethylene insulated conductors can be materially improved when a properly designed water cooling system is used for the extrusion screw.

* * *

Figure VIII is a photograph of important elements in what we call our multicoat extrusion line. This picture shows our 400 pound hard copper reel supply and strand annealer which is identical with the 42 units operating in our PIC cable plant. After annealing, the copper conductor enters the tool capsule of the common extrusion head and emerges as a completely insulated and jacketed wire. Excluding the new eight position temperature control unit in the background, the balance of the facilities are substantially the same as those

(*Please turn to page* 657)

Preliminary Announcement Of
The West Coast Regional Meeting
of
THE WIRE ASSOCIATION

June 22-23, 1961, Jack Tar Hotel, San Francisco, Cal.

PROGRAM SCHEDULE

Thursday, June 22

10:00 A.M. — Registration.

2:00-5:00 P.M. — Technical Session. Six papers will be presented, each on a timely subject.

Friday, June 23

9:30 A.M. — Plant Inspection Trip. Busses leave the hotel for a visit to the South San Francisco Mill of Bethlehem Steel Corp. Particular emphasis will be placed on the Bolt Department.

Luncheon will be served at the International Inn.

The return trip will be made via the Scenic Coast route for the enjoyment of the group.

6:30-7:30 P.M. — Hospitality Hour. This will be sponsored by Bethlehem Steel Corp., The Colorado Fuel & Iron Corp., Columbia-Geneva Steel Div. of U. S. Steel Corp., Planett Mfg. Co., John A. Roebling's Sons Div. of C.F.&I., and Wire Specialties Co.

7:30 P.M. — Dinner. Door prizes will be distributed and a top-notch after-dinner speaker will address the gathering. Ladies are invited.

This meeting gives every promise of upholding the traditional hospitality and interest of our West Coast Regional Meetings.

All wire men are cordially invited to be present for the full schedule of events. Make your plans now to be in San Francisco on the 22nd and 23rd of June.

Full program details next month

THE WIRE ASSOCIATION

Richard E. Brown, Executive Secretary

453 Main St. **Stamford, Conn.**

Automatic Drive Control Used in a Swiss Continuous Merchant and Rod Mill

by Leo Walter
Consulting Engineer
Painswick, England

How the other fellow does it, is described in this description of a Swiss rod mill.

It is wellknown that characteristics of electrical drives in modern continuous hot rolling mills influence output and quality to a great extent. An example of high-precision drive control in operation at Messrs. Ludwig von Roll Steelworks A.G., Gerlafingen, Switzerland will be given in the following.

* * *

Fig. 1 illustrates the general layout of the mill. Starting at the bottom of the plan it shows the following: H.V. switching station, cells for the tap-changing and mutator transformers, mutator room, control and supervisory room with regulating equipment and, immediately alongside the mill, the machine room. To protect the motors from the dusty atmosphere of the mill, they are placed, where feasible, in a separate room which also contains most of the motor-generator sets for the auxiliary drives and for the excitation circuits. A number of ventilating systems are provided for the forced-draught cooling of the main motors. Their arrangement is clearly shown in Fig. 1. Each system cools a number of motors, each unit having one fan which extracts the necessary quantity of air from the main duct. The exhaust air is cleaned in filters and cooled in a common cooler to the desired inlet temperature.

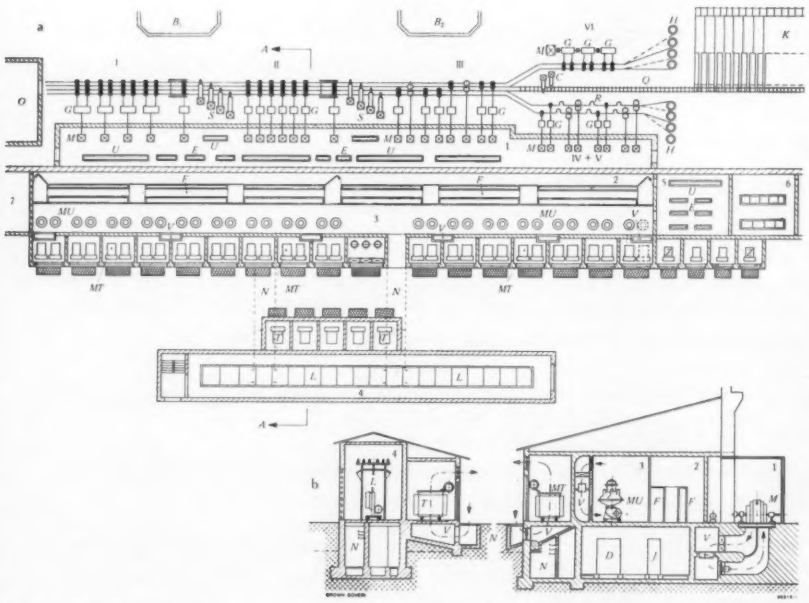


Fig. 1 — Hook-Up of Mill

* * *

Automatic control valves with adjustable temperature gauges regulate the water consumption according to the load on the motors and the cooling-water temperature. The ventilation systems thus always work with a minimum of cooling water.

Control Room

The control board with all the supervisory and regulating equipment is located in the control room adjoining the machine room (Fig. 2). The instruments light signals, control switches, and position indicators are mounted on the front of the panels, from where the high-voltage gear, mutators and motors can be taken into service one after the other. The actual running-up of the mill, is, however, controlled from various pulpits alongside the train. Each motor with its mutator is allotted a control panel; on the adjacent panel is the corresponding regulating equip-

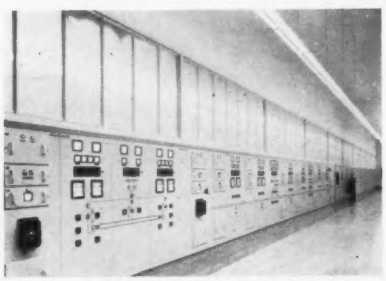


Fig. 2 — Control Room of the Rolling Works.

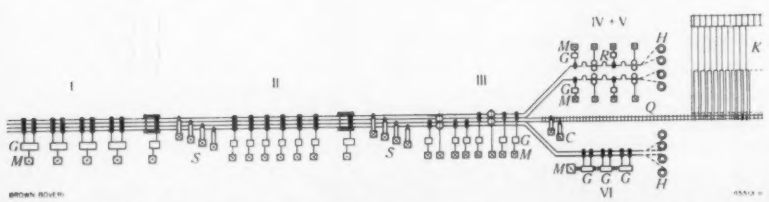


Fig. 1A — Basic arrangement of the high-production continuous hot-rolling mill. I is the roughing train; II is the first intermediate train; III is the second intermediate train; IV & V are the finishing train with automatic loop control; VI is the Morgan finishing train; M = motor; G = gear; H = coiler; Q = roller table; S = crop shears; and K = cooling bed.

ment, some of which is of the draw-out unit design. In case of disturbance these units can be easily removed and replaced by a spare.

* * *

The actual controls can also be separated from the regulating equipment, a central control room being provided from which the mill can be taken into service. (Fig. 3). Instruments are provided in

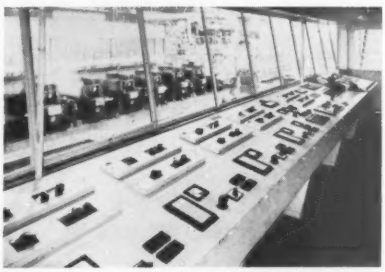


Fig. 3 — Control Pulpit of the Merchant and Rod Mill. * * * * * *

the control boards for all main drives, enabling disturbances in the rolling process to be detected and permitting the various rolling programmes to be evaluated. Furthermore, the control panel contains the necessary supervisory equipment, all electric faults being indicated by an alarm signal. At the same time light signals indicate the nature and location of the disturbance. The relevant motor is disconnected by the supervisory equipment only in an emergency. Usually, it is left to the operation in the control room to disconnect a faulty motor after he has contacted the mill personnel. The light signals remain alight until the fault has been cleared.

Mutator Room

Six-anode, pumpless, air-cooled mutators are employed throughout. Since their tanks are at cathode potential it is advantageous to provide a separate, locked mutator room in order to prevent unauthorized persons from coming into contact with live parts. Moreover, it is a wellknown fact that the load capacity of a mutator depends largely on its temperature. Hence the ambient temperature has to be controlled within certain limits. The speed of each mutator fan is consequently controlled in such a manner that the mutator always works at the most favourable temperature.

* * *

The large number of tanks necessitates a central ventilating system with separate air ducts to each mutator. It has proved expedient to adopt the closed-circuit principle in order to prevent dust collecting in the mutator room.

* * *

The air transfers the waste heat to water circulating in coolers. Automatic regulating valves (in the cooling water circuit) keep the inlet temperature at, say, 35°C. Thereby the quantity of cooling water required adjusts itself to the load conditions. The transformer cells immediately adjoin the mutator room and are so arranged that each cell is accessible from outside the building.

* * *

A cable duct connects the transformers with the h.v. switching station. Also, at floor level, is the low-voltage distribution gear and the battery room as well as the room housing additional motor-generator and exciter sets which cannot be accommodated in the machine room. Passages for the cables and cooling air have to be provided in the basement. Moreover, the d.c. switchgear and the open-type contactor frames for the auxiliary drives are also usually located in the basement.

Drives and Controls of the Rotating Shears

Of the numerous d.c. and a.c. auxiliary drives, only those for the rotating shears will be briefly described, followed, in conclusion, by some remarks on the functions and control of an automatic cooling bed. Between the various sections of the continuous merchant and rod mill under consideration, rotating shears are provided which either subdivide the rolling stock, crop it or cut it to scrap sizes. The subdivision of the rod becomes necessary whenever the weight of the final bundle has to be reduced (normally the weight of the bundle is equal to that of the billet). To crop is to cut the tip off the rod thus ensuring that it enters the groove without trouble. After passing various stands the tip of the rod cools and splits because of the repeated deformation and this may lead to frequent stoppages.

* * *

If, for any reason, the rod still does not enter the groove properly, the material loops and builds-up unvoluntarily between two stands so that the next rod in the same stand has to be cut into scrap and returned to the furnace for remelting. Another method consists of grabbing the rod with tongs between two stands, so as to pull it out and to wind it on special coils before it cools. This sometimes facilitates the return to the melting furnace.

* * *

As the rolling stock has to be cut while in motion, only rotating shears may be used, since the speed of the knives must be adapted to the specific rolling speeds. Usually the knife speed is set about 10-20% higher than the rolling speed. For this a tacho-generator coupled to the last stand before the shears automatically adapts the generator excitation to the speed of the last roll. Because of the high rolling speeds, especially in the last section of the mill, it is quite a problem to bring the blade up to the desired speed quickly enough, as the time available is extremely short and the angle of acceleration relatively small. This can be achieved by two different methods:

* * *

By extremely rapid acceleration from standstill, the driving motor being rigidly coupled to the blade (starting shears) or by coupling the knives to the running motor by means of a magnetic clutch (rotating shears).

* * *

For high rolling speeds the starting shears are designed to cut after the blades have made several revolutions. In contrast, rotating shears can be generally applied at most normal rolling speeds. They are controlled with the aid of photocells which detect the passage of the leading end of the rod and actuate a time relay which determines the correct timing for the cut, its reference value being given by a tacho-generator coupled to the motor of the stand immediately before the shears. In order to obtain a minimum tolerance when

(*Please turn to page* 657)

Elgin Diamond Compound is formulated for the job . . . no instinct or "feel" required

Pre-mixed diamond compound—from any point of view—is superior to dry diamond individually mixed in the die room. In Elgin diamond compound each particle of diamond is thoroughly wetted and permanently suspended in the vehicle. Diamond won't settle or concentrate.

Nothing is left to chance. The machine operator gets just the right amount of diamond abrasive to do the job efficiently and economically. He makes no judgement on the "dip." And there's never any waste because the judgement is in the Elgin package.

Contact your Elgin engineer for assistance in formulating the exact diamond compound for your needs or write for catalog.

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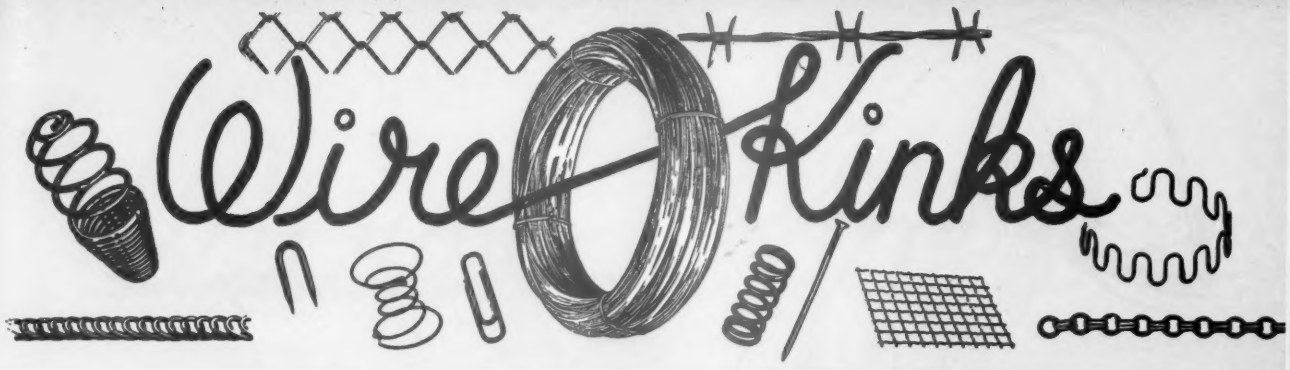


Readers are invited to send us how-to-do-it items for this department. For each item received that is published we will pay contributors $10.00. Your co-operation will be appreciated by us and our many readers. May we hear from you?

Ring Travelers

QUESTION

I would be interested to know something about ring travelers for the textile industry — the metals, their properties, and the processing techniques. Can you supply information on this product?

ANSWER

There are several types and a great many sizes and styles of travelers in each type.

* * *

Regular spinning travelers are made of round edge flat steel wire and half round wire, the edges of which must be very smooth. They are made in different circle sizes and with different flange openings, some of which are square.

* * *

Horizontal steel rings are used for dry twisting. Most vertical travelers for twisting are made of bronze, although some are steel. The variations in size and shape are occasioned by the service to which the rings will be put in manufacturing operations. Dimensions have to be held to very close tolerances—as much as .0001 of an inch and to the hundredths of a grain in weight.

* * *

The chemical composition and physical properties control the wear, corrosion, and fatigue resistance of the travelers, which operate at speeds often exceeding 12,000 revolutions per minute without lubrication. Resistance to wear, therefore, is very important. Dimensional accuracy is necessary because high speed can cause vibration and fatigue.

* * *

Phosphor bronze wire is required where wet twisting is to be done. Both bronze and high carbon steel wires are ordered to exacting specifications as to chemical composition, grain structure, degree of hard drawn finish, etc. Bronze wire cannot be hardened by heat treatment, but steel has to be carburized and tempered to provide the needed wear resistance. All rings must be brought to a high degree of smoothness with a very fine polishing agent in a tumbling barrel. Fine grit and steel balls are used for steel travelers, while a fine agent like leather meal is used for bronze.

* * *

Special precision rolling mills are employed to flatten and shape the wire, following which the wire is fed into a straightening, cutting and forming machine. Such machines can produce 6000 rings per hour in the large sizes and up to 15,000 rings per hour for the smaller sizes.

* * *

Inspections and tests at every step are essential to control size, weight and quality of the travelers.

Preparation of Wire for Enameling

QUESTION

We are approaching your goodself as a reader of your journal for suggestions on the problems we are facing with our product—Super Synthetic Enamelled Copper Wire. Problems we face are as follows:

1. Insulation loses adherence and peels off from copper wire. This character develops quite a long time after its manufacture, say after about 6 to 12 months.
2. Black spots appear on the surface that give a bad appearance.

The process we are following is as follows:

1. Rods of 1/4", 3/8" and 7/16" diameter (which are made by hot rolling "Electrolytic" quality copper ingots) are pickled in 20% sulphuric acid at 80°C, washed with water (rain stored) under 200 pounds pressure and dried by dipping in water at 95°C. Rods pickled this way are cold drawn the same or the next day.
2. In dry drawing mono-block (up to 12 SWG) we have been using Rape Seed oil but have recently changed over to Shell-X-37 compound for experimentation.
3. Further up to 21 SWG size, wet drawing is carried out using Shell-X-37 compound as a lubricant.
4. Up to 36 SWG "Colma Compound" is used in a wet drawing process.
5. Portion of the product is annealed at a furnace temperature of 450°C under vacuum. Due to insufficient capacity of vacuum annealer, the rest of the product is pre-annealed in an atmosphere of nitrogen, quenched with water and immediately enamelled. In the vacuum annealer, the product is exposed to atmosphere after cooling.

* * *

Will you kindly publish this same in the esteemed columns of your journal that we may have the benefit of the advanced knowledge and experience of your readers?

ANSWER

I have discussed this problem with two well-qualified persons. We all agree that your correspondent's

Wire Machinery Inc.

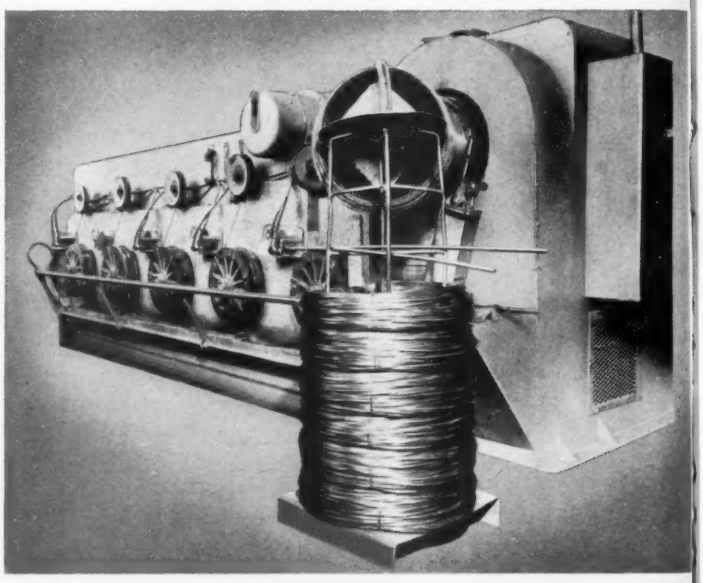
brings

EFFICIENCY

to YOUR finger tips!

SAVE With Whitacre DEAD BLOCKS

FITS ANY INSTALLATION



YOU CAN LOCATE YOUR WHITACRE WIRE DRAWING DEAD BLOCK ANYWHERE WITH WIRE LITERALLY PIPED FROM YOUR DRAWING MACHINE, WHITACRE DESIGN PERMITS ITS USE WITH ANY TYPE OF WIRE DRAWING MACHINE.

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- EXTRA LARGE PACKAGES
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Wire Machinery Inc.

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CHICAGO 32, ILL.

Wire Kinks

problem is caused by faulty surface condition of the wire prior to enameling.

* * *

The wire is either dirty or oxidized. Either will result in poor adhesence. Oxidized copper will especially show up with time as even light flash ozides will continue to grow under the enamel coating as oxygen may pass through the coat.

* * *

A dirty surface will result from dirty quench water in the pre-annealers, or lack of combustibles in pre-annealer atmosphere. From ½ to 1% combustibles in pre-annealer atmosphere will help burn off drawing compounds as well as remove light oxide films adhering to the surface.

* * *

Oxidized surfaces might result from small amounts of oxygen in the nitrogen atmosphere in the pre-annealers. It may be that the pre-annealer is leaking air. Sometimes the surface of the wire will become oxidized in the enamel oven if the first coat of enamel applied is too thin to completely seal the surface of the wire. In this particular case the wire coming out of the vacuum annealer may still be hot enough to pick up oxide.

* * *

I would recommend the following:

1. Make sure vacuum annealed copper has cooled to a temperature below 150°F **in the center of the coil.**
2. Use of prepared atmosphere in the pre-annealers which contains ½ to 1% combustibles and no oxygen.
3. Inspection of annealers for air leaks.
4. Very clean pre-annealer quench water.
5. Pay special attention to first pass enamel dies to make sure that the wire is completely covered to seal surface as wire passes through the oven.

I hope that this will help your reader.

Resistance Wires

QUESTION

I would like to know something about resistance wire, its uses and its composition. Can you tell me about them?

ANSWER

A large family of wires comprise this category, which find applications in such consumer appliances as toasters, percolators, irons, ranges, cigar lighters, roasters, broilers, heaters and a multitude of related mechanisms, while a wide range of industrial applications makes use of resistance wires in heat treating ovens, furnaces and kilns, as well as miscellaneous melting equipment.

* * *

Some of the electrical resistance alloys will have formulations, for example, containing 80% chromium and 20% nickel; 15% chromium, 60% nickel and 25% iron; 10% chromium, 60% nickel and 30% iron; 20% chromium, 30% nickel and 50% iron; 17.5% chromium, 35% nickel and 47.5% iron; 5% chromium, 30% nickel and 65% iron; 55% nickel and 45% copper; and many others in combinations of these elements to produce specific electrical resistances.

* * *

Such wires are in a class by themselves in that while the wire is sold in coils or on spools, the customer is actually buying electrical resistance units or ohms. The customer buys ohms per pound in specified sizes or ohms per foot, for which purpose a manufacturer supplies tables setting forth the gauges and the corresponding electrical and physical characteristics for the different formulations.

Fibrous Glass Yarns

QUESTION

What are the principal uses and properties of glass yarns in the wire and cable field?

ANSWER

Fibrous glass yarns have been engineered into many electric cable constructions as protective braids and wraps, supporting braids and wraps, as tension members, and as filler material. It is used for the insulation of some types of magnet wires, alone or in combination with other materials.

* * *

In braids the number of picks per inch required to meet classes A, B and C braid coverage is dependent upon the yarn spread, number of ends of yarn per carrier, number of carriers, diameter of the conductor, and the yarn thickness. Formulas have been developed to determine the picks per inch, when all of these variables are known.

* * *

In addition to the yarn coverage data, it also is important to calculate the number of pounds of yarn used or to be used per thousand feet of cable as this is useful in determining the economics involved in the cable construction. To do this, the yarn can be stripped from a given length of cable, the weight

(*Please turn to page* 662)

Use this Steelmark on your consumer products

CF&I BLACK SATIN

and other quality wires

Steel-strapped Coils
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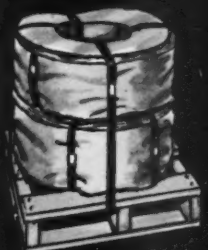

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BLACK SATIN—a newly developed finish on Round and Square Oil Tempered Wire—is another result of CF&I's never-ending search for better and better wire products. Made by tempering wire under controlled atmospheric conditions, this powdery oxide finish serves as a lubricant during coiling and crimping operations. Black Satin reduces tool wear and cuts costly machine downtime. CF&I-Wickwire's Black Satin Oil Tempered Wire is available in continuous unwelded lengths up to 600 pounds in weight . . . in a full range of gages and sizes (.562 to .023 diameter) . . . and in coils from 16″ to 72″ in diameter. Straightened and cut lengths from 6″ to 24′ or longer can also be supplied. For your ease in handling and re-ordering, Black Satin is color-tagged to provide a complete record of its processing and intended use.

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7966

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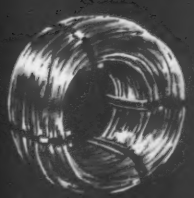
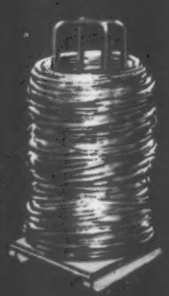
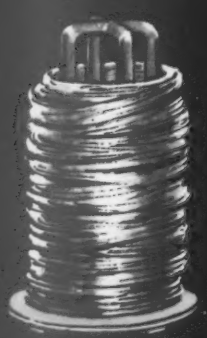


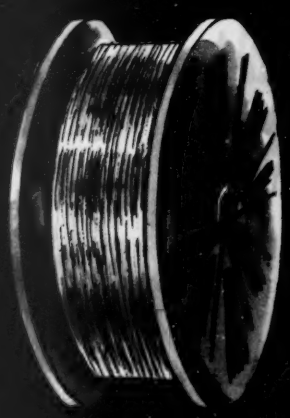
Shaped Coils (1500-2500 lbs. capacity)



Stem-paks® (500-1000 lbs. capacity)



Returnable Spiders (2000-3000 lbs. capacity)



Reels (500-800 lbs. capacity)

Revolutionary Heating System — Electrical Potential Applied to Reinforcing Fabric

This article points to an incentive for broadening the use of steel wire reinforcing fabric in concrete building construction.

A revolutionary heating system, in which the reinforcing wire fabric in a building's concrete floor slab serves also as an electric heating element, has been installed as a test at Minot, N. D. The unusual heating system was built into Northern States Power Company's new 6500 square foot service center and warehouse, on the outskirts of the city, for which the company furnishes both electric power and telephone service.

* * *

The electric heating system, which will be tested in a building subject to normal use and under everyday conditions (including North Dakota winters which sometime produce minus 40 degree temperatures) is revolutionary from four standpoints—architect, owner, contractor and power company.

* * *

From the architect's standpoint, the use of concrete reinforcement for heating eliminates the need for a furnace room, and thus provides more usable cubic space. (Space must be provided for the necessary transformers, however, in this case, above ground, along the building's center partition.)

* * *

From the standpoint of the owner, the "double" use of welded wire fabric in the floor slab—as reinforcement, and as heating element—represents economy in use of material, and saves money over the cost of the more conventional systems of radiant heating, such as copper tubing for circulating hot water, or especially manufactured electric resistance cables. The elimination of furnace equipment likewise cuts costs, but balanced against this is the cost of the necessary transformers ($675 each, in this case).

* * *

Another owner economy incorporated in this design is that the floor grid will be energized primarily at night to store heat in the floor and underlying area thereby eliminating an increase in the daytime demand factor. Baseboard type resistance heating is provided to supplement the "stored heat" during late afternoon hours. However, if required, a thermostat will override the preset schedule to energize the floor grid during daytime hours.

* * *

As for the contractor, the widespread adoption of electrically charged concrete reinforcement, will change his way of installing welded wire fabric, and will require learning techniques to make the fabric function as electric conductor as well as strengthener of the slab.

* * *

Finally, from the standpoint of the power company, if the in-service tests prove the heating system to be practical in both operational and economical aspects, then another wide market will open to take up some of the spare winter-time generating capacity which is resulting from the peakloads (in some parts of the country) built up to run summer-time air conditioners. Also, as indicated above, the peak demand for this system should occur at night during a normally low consumption period.

* * *

In the Minot installation, three different styles (or types) of welded wire fabric were used—66-44, 66-66, and 66-88. The first pair of figures in each case refers to the 6 inch spacing of the wires; the second pair of figures designates the gauges of the wires, ranging from #4 (nearly 1/4" diameter) to #8 (about 1/6" diameter). Since, for reinforcement purposes alone, 66-66, 66-88, or even 66-1010, may be specified, depending upon anticipated use of the floor slab—office, warehouse, etc—the heavier styles in **this** case were dictated by electrical considerations.

* * *

In the major warehouse area, the heavier 66-44 was used in order to carry a heavy flow of current and provide the desired floor temperature. In the office area, 66-66 was used, because here, lower current flow and floor temperature were

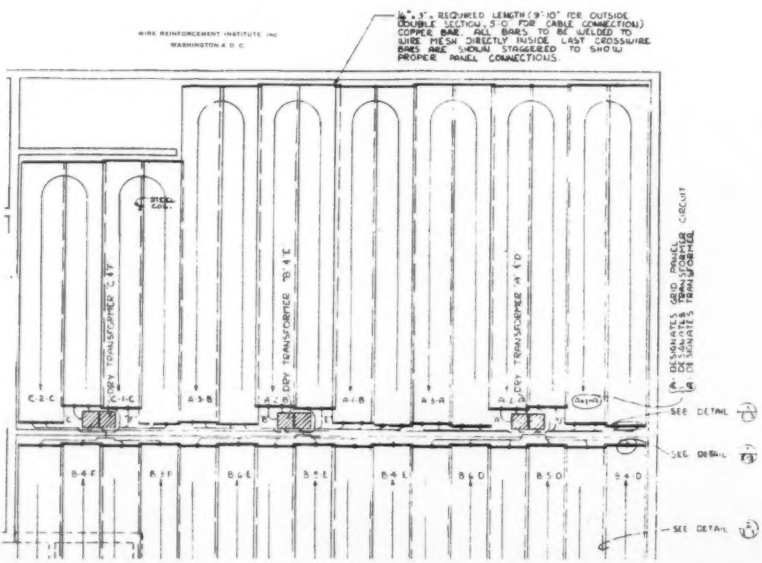


Fig. I

planned, the baseboard units helping to heat this space. The lightest style, 66-88, was placed in a sectional area of the warehouse, where less current will be required in order to maintain the desired floor temperature.

* * *

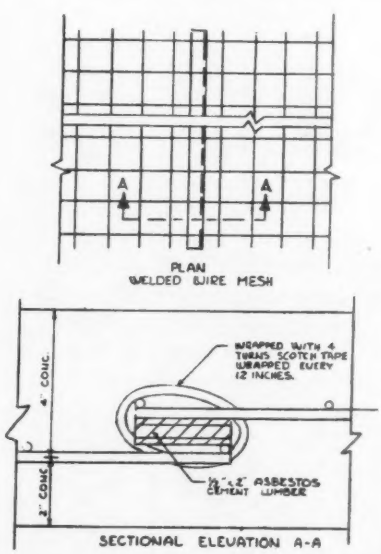
The major problem to be solved by the designer in effecting dual use of the wire fabric as both reinforcement and electrical conductor, was how to accomplish both these functions, without impairing one or the other. To be effective as reinforcement in a concrete slab, welded wire fabric must be overlapped to assure continuity of its crack-controlling ability. Naturally, in order to maintain a proper flow of current, the designer had to electrically separate the overlapping lengths of fabric.

* * *

This was effected by placing between the lengths of fabric, a 2 inch wide, ½ inch thick strip of cement asbestos lumber (transite), tied securely in place every 12 inches by electrical scotch tape, wrapped about the "sandwich", formed by the insulation and the overlapping wires.

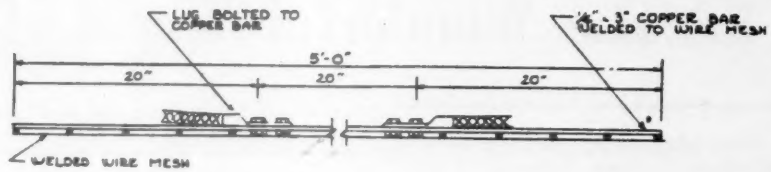
* * *

In order to apply the electric potential to the lengths of wire fabric, and establish a path for the flow of the current, ¼" x 3 inch wide copper bars were welded

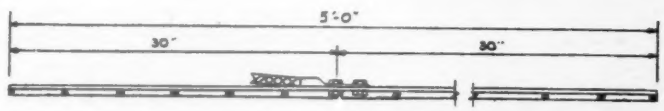


WELDED MESH OVERLAP DETAIL (2/E-3)

Fig. 2 * * * * * * * * * * *



FEEDER CONNECTIONS TO WIRE MESH (3/E-3)



FEEDER CONNECTIONS TO WIRE MESH (4/E-3)

Fig. 3 — *

across the full width of each length. At the ends nearest the transformers, which hugged the central partition wall (between the warehouse area and the offices and shops) these bars were five feet long; but at the far side, the copper buss bars were 9'-10" long, bridged two strips of fabric and served to conduct the current from one length to its immediate neighbor. Thus, the current, lead by cable from the transformers to the end of one length of fabric, followed a U-shaped path, down one length, back the other, and back to the transformer.

* * *

Seen from above, the overlapping, electrically separated however, lengths of wire fabric, with their connecting cables and copper buss bars, looked like the elements from an immense toaster.

* * *

In order to facilitate the placement of the wire fabric, the welding of the copper buss bars, and the insulating and tying of the overlapping lengths, the designer specified that the floor slab be constructed in two stages. The first stage was a two inch thickness of unreinforced concrete placed over a polyethylene vapor barrier on a well compacted fill of 6" of selected gravel. The surface of this first two inch course of concrete was purposely left rough for bonding with the next course.

* * *

After initial set of this first, 2" course of concrete, the electrical contractor was permitted to move onto it, and, having the benefit of its flat surface, was able to place the fabric, attach the buss bars, and tie the insulation without fear of breaking or damaging the fragile strips of asbestos cement.

* * *

With the fabric in place, cables bolted to the buss bars and led to the transformer locations, and electric tests made to be sure of proper current flow through the grid, the remaining four inches of concrete slab was placed. Conventional concrete was used, and concreting was done in normal manner.

* * *

The only departure from usual wire reinforced concrete construction procedure was dictated by the extreme care taken to prevent displacement of the fabric lengths or damage to the insulation. Usually, wire fabric is supported or "hooked up" into the concrete as the pour progresses, in order to position the reinforcement at or above the midpoint where it's most effective in controlling and minimizing cracking. In this case, however, it was decided to leave it in position on the previously placed 2" course of concrete, with the expectation that some slight displacement upward would occur (without damage to the insulation) and thus it would approach the ideal position.

* * *

The 3000 psi 28 day ready mix concrete was allowed to moist cure 7 days under Sisalkraft. The floor area of each half of the building

(*Please turn to page* 658)

The Wonderful World of Wire Rope

A non-technical treatise on wire rope and the part it plays in modern industry.

Dangling from cranes, supporting huge bridges, helping to drill oil wells and steer ships, wire rope does more jobs for us than most people realize—and is far more complex than is commonly supposed.

* * *

Wire rope is made in many constructions. For example, some ropes may have as many as 18 different strands—with each strand containing up to 46 separate wires. The strongest wire rope is made of extra improved plow steel wire. Some wire ropes have cores that are springs. Rope types and sizes are almost endless.

* * *

Oddly enough, these sturdy products have to be broken in—and requiring expert handling if they are to perform their heavyweight duties without breaking. Like its pantywaist cousin, the hemp rope, wire rope can snarl or tangle when carelessly used.

* * *

Even a partial list of its uses reads like a roll call of American industry. Wire rope goes to sea in the form of rigging and guy ropes, fishing ropes and cargo fall lines, mast arm ropes, steering ropes, mooring lines and towing hawsers. (A tow rope 2⅜ inches in diameter, made of the best quality improved plow steel, may have a breaking strength of 207 tons!) Aircraft cable, iron sash cord, can conveyor and traction drive ropes, ropes for mining, logging, oil rigs and construction equipment are made of wire rope. The thin, graceful strands of rope form part of the vertical supports on many bridges.

* * *

Wire drawing has even become a recognized engineering specialty! **Jones & Laughlin,** a major steel company that is also a leading producer of wire rope, employs men as "Rope Engineers". The company explains that it considers wire rope a machine, which must be precision engineered and given as careful maintenance as other special purpose machines.

* * *

The manufacture of these novel machines is a story of ingenuity expressing itself in many an unusual twist. Often literally—for the manner in which wires and strands are twisted is a big factor in determining the flexibility of the rope and its resistance to fatigue and abrasion. An ingenious twist to insure greater flexibility and easier spooling and handling of the rope is called preforming, a process in which the wire and the strands of the rope are shaped to fit the position they will assume in the finished rope. Preformed rope is more flexible and less cranky because the internal stresses have been removed so that the rope doesn't work against itself.

* * *

Some of the newest ideas are an "inside story", concealed beneath the twisting strands of the rope. The core of the rope is its foundation, around which the wires are laid; a failure at the center means you've reached the end of that particular rope. Rope centers have always been made of vegetable fibers, a single wire strand, or a separate wire rope. Recently, J&L has added two new types. Plastikore rope has a tough polyvinyl plastic center which avoids the weaknesses of the fiber center: resistant to water, acids, caustics and other substances; it won't rot, rust, or develop fungus growths. Springkore, the rope with a steel spring center, is highly flexible for very long periods of time, resists crushing action better than other types, and has less internal friction. In addition, the hollow inside of the spring can be packed with rope lubricant so that the rope is continuously oiled as it does its daily work.

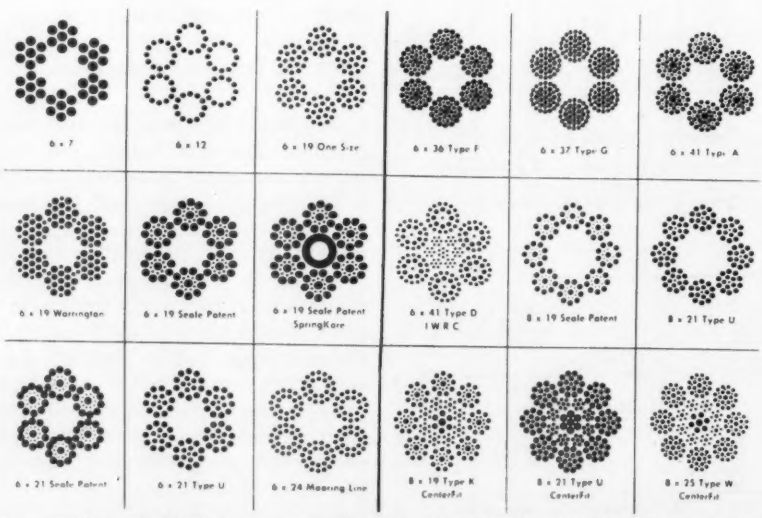
* * *

Lubricating a wire rope is as necessary as putting motor oil in a car—and several special lubricants intended for the job have been developed. Carrying the automobile analogy still further, J&L rope engineers advise wire rope operators to move ropes at regular intervals in order to shift wear—just like rotating tires on an automobile, J&L men say.

* * *

The wire rope operator has anything but an easy job. He must know just how to "spool" a line (roll it on a drum) and run it without crushing, distorting or kinking

(*Please turn to page* 661)


6 x 7
6 x 12
6 x 19 One Size
6 x 36 Type F
6 x 37 Type G
6 x 41 Type A
6 x 19 Warrington
6 x 19 Seale Patent
6 x 19 Seale Patent SpringKore
6 x 41 Type D I W R C
8 x 19 Seale Patent
8 x 21 Type U
6 x 21 Seale Patent
6 x 21 Type U
6 x 24 Mooring Line
8 x 19 Type K
8 x 21 Type U
8 x 25 Type W

Cross sections of different wire ropes illustrate the patterns of individual wires in the rope strands. The number of strands in a wire rope may vary from three to eighteen, but most wire ropes are made of six to eight strands. The more strands a rope has, the greater its flexibility. Strands made of a large number of small wires are more flexible than strands formed with a small number of large wires. But the latter are more resistant to abrasion. * * * * * * * * * * * * * *

Technical Papers for...

THE ANNUAL CONVENTION of THE WIRE ASSOCIATION

October 23-26, 1961, French Lick-Sheraton Hotel, French Lick, Indiana

There still is opportunity for those who are willing to present papers to volunteer. Papers may be placed in any of these categories:

- **FERROUS ROD, WIRE OR WIRE PRODUCTS**
- **NON-FERROUS MECHANICAL WIRE OR WIRE PRODUCTS**
- **ELECTRIC WIRE AND CABLE**

The title of the proposed paper and a brief summary of what you propose to cover should be sent to the Program Committee Member nearest you.

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For Electric Wire & Cable Section papers, write any member of the Non-Ferrous Program Committee or any member of the Electric Wire & Cable Management Committee listed elsewhere in this issue of Wire and Wire Products.

May we count on your cooperation?

THE WIRE ASSOCIATION

RICHARD E. BROWN, Executive Secretary

453 Main Street **Stamford, Conn.**

An Employment Office in the Wire Industry: Some Aspects of Its Responsibilities

by Mrs. Ivy Hobson
The Whitecross Company Limited
Warrington, England

This paper, copyrighted by Frederick Smith & Co. Wire Manufacturers Ltd., is published with their permission. It was presented at the Staff School of the Company's Caledonia Works in Halifax, England.

I Management

It is an indisputable fact that each individual Company needs Personnel Management to suit its particular requirements.

* * *

To fulfill these needs it is necessary to build up the Manager's own staff so that he can rely on loyal and conscientious support from each section which comes under the supervision of the Employment Office: the key men (or women) attached to the Police and Fire Precautions, Ambulance Room, Time Office, General Cleaning Section, and his own personal clerical staff. It would be impossible for him to attend to every detail of each section and it is, therefore, essential for him to delegate a considerable amount of work and responsibility to his subordinates. Upon his choice of key men depends the success or otherwise of his job.

* * *

In theory, this man should have an encyclopaedic knowledge of the Factory Acts and Accident Prevention, Pensions Funds, First Aid, Trade Union affairs, methods of training, selection and recruitment of labour, and above all, a mind having the agility of a flea to hop from one subject to another.

* * *

In practice, whether it is solely for the engagement of labour, or for a combination of a little of all these subjects, one of the most important abilities appears to be that of skillful interviewing, and being able to adapt his methods to the people being interviewed. To a great extent, this does not mean academic qualifications; in fact, it is often necessary to use the simplest phraseology to extract information and get response from the applicant.

* * *

One of the most successful personnel manageresses I have met, with a wonderful understanding of human nature, has the ability to make young people feel that they are necessary and gifted, and at the same time give acknowledgment of efficiency and experience to the older women: her own accomplishment and wishes are always made to appear secondary, but invariably the interview ends exactly as she intends it to.

II Amenities

In our Company, the title "Liaison Officer" would more correctly describe the duties of our Personnel Manager. Initially responsible for the engagement of labour, although the final decision is left with the Departmental Manager, he is also concerned with the amenities which the firm offers employees.

* * *

Of these amenities, I think one would regard safety and welfare as the two most important. In regard to safety, it is worth considering that figures seem to indicate it is a lack of familiarity with machines and surroundings which contributes to accidents and not the age factor. Reviewing the statistics covering 1946 which had the greatest intake of labour shown in our records since the Company merger and also for 1958 which had the smallest intake, this fact is borne out as shown in the table on the next page.

* * *

It is worth noting in his connection that in each group given there are only two men between the ages of 55-70 (i.e. with 41-50 and 60 years' service) who have met with accidents.

* * *

Looking again at the intake of labour for 1958—the smallest we have known—and our reportable statistics for that year, the preceding statement is confirmed by the fact that the Accident Frequency Rate as given in the annual return to the Factory Inspector's Office was the lowest on record. (For the uninitiated, the Frequency Rate is not merely the number of accidents which occur, but the number of accidents relative to man hours worked).

* * *

These observations are substantiated by a recent publication covering a survey made some years ago by the British Iron & Steel Research Association known as OR (Operational Research). The figures given related to the findings of a firm over a certain period, and it was ascertained that people who had left the Company—in effect floating labour—had had about one and a half times as many accidents as those who had stayed with the Company, and who could be regarded as part of the Company's fixed labour force.

* * *

Although everything possible is done to avoid accidents, the two most obvious ways in which we can assist by fringe benefits which directly concern the employees' security and conditions of work are for the supply of specially made boots and shoes and the maintenance of an Eye Clinic.

* * *

Despite the fact that our Company does everything possible to encourage the purchase and use of protective footwear, only a very small proportion of the workers take advantage of the arrange-

	Length of Service	No. of Accidents	Percentage of Accidents
1946			
	Under 1 year	26	39.39
	Between 1 to 5 years	14	21.21
	" 6 " 10 "	4	6.06
	" 11 " 20 "	6	9.09
	" 21 " 30 "	10	15.15
	" 31 " 40 "	4	6.06
	" 41 " 60 "	2	3.03
1958			
	Under 1 year	5	11.62
	Between 1 to 5 years	8	18.63
	" 6 " 10 "	8	18.63
	" 11 " 20 "	9	20.3
	" 21 " 30 "	6	13.71
	" 31 " 40 "	5	11.63
	" 41 " 50 "	2	4.65

ments made for them: approximately six per cent of the women and twenty per cent of the men. Men are certainly much more practical and willing to admit the value of the steel toe capped shoes. Following a recent accident an employee voluntarily stated that it was his own "stupidity" which had caused him to lose two months' work. Women, however, invariably consider them as not being sufficiently smart and would not wear them unless made a condition of service.

* * *

Adverting to the Eye Clinic, this is held once a week under the very capable guidance of an Opthalmic Surgeon who gives suggestions for treatment or the provision of spectacles, either for protection or vision. Every facility is available at this Clinic which is very convenient for the employee and entails very little loss of time.

* * *

Although protective spectacles are provided, it is not a condition of employment that they should be worn, except in the cases of personnel sighted in one eye only, boy learners, and in one of the most modern of our wiredrawing mills where the increased speed makes this ruling necessary. Consequently, there are always a number of men who foolishly try to work without the necessary eye protection. The types of spectacles issued are in keeping with the hazards of the work in hand.

* * *

We have recently introduced a ruling that all youths shall be compelled to wear eye protection suitable to the work on which they are engaged. Whilst the older men are in many cases amenable to suggestions for their sight protection, there are quite a number who persistently ignore any efforts made for their safety. In the case of new entrants they will start knowing that such measures are a ruling of the Company and will grow up with the idea of this wise regard for their safety. This ruling should, over a period of time, reduce the high percentage of accidents for newcomers as quoted earlier.

* * *

We have recently given instructions that the slightest eye accident should be reported even if it involves only the removal of a small foreign body. Our insistence on this has been of great value. In one particular case, an employee complained of slight inflammation which gradually worsened. Although the man protested at the suggestion of seeing the Surgeon at the Clinic, he was most grateful afterwards. He received immediate treatment which lasted several hours. The infection had proven to be the initial stages of glaucoma*; which, with its serious consequences, had been averted. We could also quote many other dangerous accidents which have been prevented through the precautionary measures taken.

* * *

The Ambulance Room has a very easy relationship with all employees and credit must be given to the personality of the Nurse and her Assistant for the good reputation which it enjoys. Gradually more advantage is being taken, not only of the Ambulance Room and its facilities, but of the trained First Aid Men who are attached to all Departments. These men, together with experienced car drivers, are on all shifts, so that when the Ambulance Room is closed, someone is always available to give First Aid Treatment where necessary. We are very fortunate, in so far as when the need arises, we are within very close distance of both the Borough's hospital and the local Infirmary.

* * *

All the employees have to pass a medical examination by our Works Doctor, before commencing work. This had not been practical until quite recently. A few years ago it would have been almost impossible, but the last two years have seen a tightening up in the demand for workers. Previously, the delay in starting, even for a day, might have meant losing a good man who knew he could get a job elsewhere.

* * *

Any difficulties in connection with local men are soon overcome; it is with applicants from outside places such as Liverpool that snags arise. We have overcome this problem to a great extent by fixing an appointment with our Doctor at 8:30 a.m. and guaranteeing to start the applicant immediately afterwards if the Doctor passes him as fit. We find that this appeals to most men. They are not wasting a day for our benefit and on our part, we feel that if they turn up to see the Doctor, they really want work and will prove worthwhile employees.

* * *

The Doctor's duties do not in any way encroach on the National Health Service, but confirm or deny the statement made by the applicant regarding his health when applying for a job. It naturally follows that we would not like to be responsible for the misdirection of labour in having given a man heavy work, when he has not disclosed the fact that he has, for example, been suffering from a gastric ulcer.

* * *

The Company wholeheartedly supports the Civil Defence organisation and does all in its power to further development of the movement among our personnel. The officer in charge is most enthusiastic and has a very high standard of efficiency both for his men and

* **Glaucoma—usually entails an operation with possible loss of sight. An infection attacking late middle age, often due to mental stress. Hardening and squaring of the eyeball, due to secretion of lymph.**

the maintenance of the equipment.

* * *

At times we have large scale practises with the support of our Works Fire Patrol, the local Fire Brigade, our First Aid Men and the Ambulance Room Staff. This, of course, gives much colour to the object of the exercise and stimulates the interest not only of those taking part, but of the onlookers.

* * *

Another welfare consideration made by the Company is the Monthly Gratuity to long service Works employees. This is strictly an "ex gratia" payment made by the Company and is in no way supplemented by contributions made by the Employees. It is one of the most enjoyable afternoons in the month when these men call for their pensions. For some of them it is quite a social event. They meet old friends and works associates, and one very important factor, it gives them an opportunity to indulge in descriptions of their ailments. The hale and hearty like to be complimented on their vigour and youthfulness and the less fortunate appreciate a sympathetic listener, especially widowers living alone. It is, therefore, better for the men to call and collect their pensions when they are well enough to do so.

* * *

They have two social functions arranged for them—a trip to Blackpool in the early summer, sponsored by our Recreation Club, and a Dinner and Concert in the early Autumn to obviate being out late during the dark nights: this latter event is organised by the Company.

III Records

It is necessary for all personal records to be kept within our Department. It would be an unenviable task to succeed the present Manager who is a local man with over 50 years' service with the Company, and whose knowledge of the personnel is phenomenal. Generally speaking he is acquainted with the family details of about eighty per cent of the employees.

* * *

This Department is also responsible for the maintenance of Labour Turnover details, Absenteeism and Sickness Records, together with Ambulance Room reports and Accident Statistics.

* * *

It is, of course, essential in this connection to be in close contact with the office of the Inspector of Factories and we are fortunate enough to enjoy the most harmonious relations with that Department of the Government, which were enhanced last year by the considerable reduction in the number of reportable accidents, and the fact that the number did not include any eye or dermatitis cases: these reportable cases also involve us in essential work in presenting to our Insurers satistics relative to the claim.

* * *

Apropos of the confidential information which we have available in the Department we are often in touch with a large number of local organisations, Education Authorities, Religious Bodies, National Assistance Board, the Employment Exchange, the Health Services for Blood Transfusion Service, Mass Radiography, anti-Polio Vaccinations, and of course the Police.

* * *

We find these organisations are always extremely grateful for any help and consideration which we give them and in turn we always receive the greatest response and goodwill on the occasions when we need their services.

IV Recruitment of Labor and Initial Training

There are various methods of recruitment of labour, the chief of which are as follows:

Training School for school leavers between the ages of 15 and 16½.
Trainee management 21-35 years.
Local and county press.
Employment exchange and Youth Employment Office, and finally,
Casual callers at the Employment Office.

* * *

The training of both young boys for the works and men for executive positions is done by our Associate Company for both economic and practical reasons. We are a much smaller Company and could not give such a comprehensive and exhaustive training in our own works. As the arrangement is at present, we are free to draw on the resources of our Associates and take advantage of their training facilities. This method is mutually advantageous as it gives wider scope for training over a larger number of different Departments.

* * *

We realise that a trained employee is an investment just as valuable as a piece of new machinery. John Russell* said "This generation like every other knows that the future of the world depends on encouraging the best". We may not have the best, but we encourage the best in those we have!

* * *

Before the suggestion of abandoning National Service was proposed our young learners were able to complete only two or three years in the Training School before their instruction was interrupted by a period in one of the Forces, which meant that when they returned to us at the age of 20/21, they would be getting the full adult rate with only three or four years' industrial experience instead of six. Now, however, it appears that in the foreseeable future, these youths will have continuous instruction and at 21 be efficient and form the nucleus of a well trained labour force, tailored for the job.

* * *

They have great scope in their variety of employment, being attached to many branches of the industry, before they make their final decision regarding choice of Department.

* * *

The Training School for these young learners was instituted about ten years ago, and now has an intake of approximately forty boys per year, of whom roughly fifty per cent make the grade.

* * *

In this way, too, we will be able to obviate enlisting labour from such other channels as advertising in the press, drawing from the Employment Exchange and engaging casual enquirers.

* * *

We have approximately 900 employees in our Works, with a small proportion of about six per cent females. Of the males roughly thirteen per cent are resident in Liver-

* John Russell—Executive secretary of the John and Mary Markle Foundation—an organization for the selection and support of medical scholars—America.

pool and special transport at a considerably reduced price is arranged to convey them to and from the Works: buses for shift workers and special train arrangements for day workers.

* * *

As a practical proposition, we need sufficient men from Liverpool to fill the buses, but naturally as a Warrington firm we prefer men from our town. Perhaps, unfairly, we tend to expand a little when an applicant is a local man even though we haven't any vacancies: for our own benefit we like to appraise his potentialities.

* * *

The different types of enquirers are interesting—enthusiastic, belligerent, indifferent, in fact some appear even too lazy to answer the questionary and it makes one wonder why such men have even taken the trouble to apply for a position.

* * *

It is interesting to note that such callers at the office appear to come in "waves". One week, perhaps many coloured immigrants applying in twos and threes. In spite of the language difficulties, and their sparse English vocabulary, these men are invariably primed in the essentials of enquiring for work: their two favourite introductions being "see the Gaffer please" and "any jobs". After a period of wet weather we usually have many enquiries from men who have been put off from the building trade.

* * *

During the Autumn we have an influx of Irishmen who have been working on the farms during the summer. From the fantastic amount of wages they expect to draw, and I say "draw" advisedly when it should be "earn", it would appear that their knowledge of England is the same as the hero of the "Mountains of Mourne" who expected to find the streets of London paved with gold.

* * *

Our close proximity to the Town's Casual Ward is also responsible for the rather large number of enquiries we receive from strangers to the Town.

* * *

As a Department we are in the closest touch with all Departmental Managers regarding the supply or transfer of labour. We try to avoid making transfers of personnel as it is generally unsettling, but this is sometimes necessary in the cases of rehabilitation after accidents, when lighter employment than the pre-accident occupation is necessary: also in avoiding redundancy due to the breaking down of plant etc. It is not always possible to plan in advance policies of action to meet the needs of superfluous labour at such times, but we make it a rule to use every means in our power before dispensing with workers even if it means putting skilled men on lesser paid jobs. Most men see the need for this action, and at the risk of a smaller pay packet are willing to accept this type of arrangement as a temporary measure.

* * *

Happily we have never had to contend with a trade dispute, although the repercussions of the General Strike and the differences of the Engineering Union disorganised us to some great extent. This, of course, creates a considerable amount of work between the Employment Exchange and ourselves, and it is worthy of note, that although in essence the dispute is between men and their employers, it is more than true to say that our Company, as employers, give wholehearted co-operation to the Employment Exchange on the men's behalf.

V Social Activities

As members of the Institute of Iron and Steel Manufacturers, we have a football team which competes for the Isgar Cup. Apart from the successes which we have enjoyed, we have, over the past thirty years visited all members of this Association when taking part in the matches. This in itself has created an atmosphere of social wellbeing which industry alone could never have achieved. It gives an opportunity for not only executives and production chiefs to meet their opposite number, but the men themselves.

* * *

Apart from any Industrial Welfare which is provided, our Recreation and Social Club make themselves responsible for an enormous amount of help to our employees. We have the usual type of assistance, such as gifts of Horlicks, Bovril, Ovaltine and Fruit to help in the recovery from sickness, cigarettes to personnel in hospital and arrangements for convalescence following an illness. The system is not too rigid and each case is dealt with individually, in an endeavor to meet the particular needs.

* * *

Under this heading of Benevolence, the Club makes a monetary grant to all our Pensioners and old servants at Christmas, and, as mentioned earlier, arranges for a day's Outing to Blackpool in the Summer.

* * *

It also organises a Christmas Party for the children of all Employees. This event creates a great deal of work. Apart from the catering, the details of the evening's entertainment have to be organised, prizes and gifts sorted into age groups, sweets and fruit packed for each child, so that on departure the children have ample evidence of the Christmas spirit which they have enjoyed. Curiously enough, the most popular item with the children, despite the usual fog and snow outside, is the provision of an ice cream as they leave the Hall.

* * *

We have very loyal support from the men and some of their wives who help to make this a most enjoyable evening.

* * *

The Club has a very flourishing Sports side, including sections for Bowling, Billiards, Snooker, Darts and Angling. The football team is more a Company matter as, being members of the Institute of Iron and Steel Wire Manufacturers, we are competitors for the Isgar Cup as referred to earlier.

* * *

The Club, with its Bowling Green and Steward's House is very close to the Works and is within easy access for all both at mid-day and the evening. It provides the all too rare occurrence for the workers to get to know the management personally.

* * *

Our Recreation Club has recently celebrated its Golden Jubilee and

(*Please turn to page* 671)

New Di-Acro Catalog

A new 32-page complete line catalog giving detailed information and costs on all Di-Acro Precision Metalworking Equipment has been announced by the **Di-Acro Corporation,** 635 8th Ave., Lake City, Minn., U.S.A.

* * *

Called Catalog No. 61, all hand and power operated Di-Acro Precision Metalworking Machines are shown. Additional pages list related accessories and expendables including single station punches and dies, adjustable punches and dies, standard V-type press brake dies, Rol-Form and Snap-Form dies.

* * *

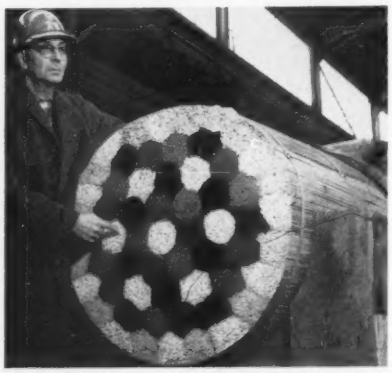
Ten basic Di-Acro Machines — Benders, Brakes, Press Brakes, Punch Presses, Rod Parters, Rollers, Notches, Shears, Spring Winders and Hole Lokator Layout Machines — are available in 46 sizes.

* * *

Twenty-nine of the machines are hand operated; the 19 power models are used primarily where long production runs and operator fatigue are considerations. Advantages are versatility, precision reproduction and long wear — each machine can be set up for a number of operations. The catalog is available upon request to the company.

Bridge Cables in New York

The new Throgs Neck Bridge connecting New York City's Boroughs of Bronx and Queens is 13,953 feet long with a suspended span of 2,910 feet. Each of the two main suspension cables is 23 inches in diameter and is comprised of 10,952 galvanized wires. The wires weigh 7,700,000 pounds.



Mock-up of Narrows Bridge Suspension Cable

* * *

The Narrows Bridge linking Staten Island with Brooklyn soon to be built will have the world's longest suspended span. Four cables, each 7,000 feet long, and nearly 3 feet in diameter will contain 26,108 lengths of wire, grouped into 61 strands of 428 wires each. The cables will weigh 30,000 tons.

* * *

American Steel & Wire Division of United States Steel Corporation supplied the wire for the Throgs Neck Bridge and will make the wire for the Narrows Bridge, which will be completed in 1965.

New ASM Metals Handbook

The new ASM Metals Handbook contains more than 2½ times as many pages on the selection and

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properties of metals as were contained in the 1948 edition. It offers nearly six times as much numerical information (as distinguished from descriptive text) in the form of charts, graphs, and tables. New emphasis has been placed on relating metals information to engineering and production practice. More first-hand examples and comparisons (a total of over 1500) are included in the current volume — the first of a series that will ultimately cover all branches of metals engineering and metalworking. More than 1300 metalworking specialists are named as contributors. 2806 definitions are included.

* * *

In addition to many highlights, such as the practical articles on selection of steel for economy in manufacturing and in machining, other major sections of the book cover carbon and low-alloy steels, cast irons, stainless steels and heat-resisting alloys, tool materials, nonferrous metals, and magnetic, electrical and other special-purpose materials.

* * *

The new Metals Handbook sells for $30.00. A copy and can be ordered from **American Society for Metals,** Metals Park, Novelty, Ohio.

New Durant Counting Instrument Catalog

Durant Manufacturing Company, Milwaukee, Wisc., announces that its new Catalog #200 is now available to industrial counter users. Entitled "Counting Instruments for Industrial Production", this 8-page catalog is combined with a newly-developed price list to facilitate selection and ordering of industrial counters.

* * *

The Catalog presents all models needed to meet ordinary industrial requirements. The models are departmentalized according to actuating methods—stroke, revolution, electric and predetermined, and lineal counters. Complete descriptive material and specifications concerning each model are clearly stated. Model variations, such as right or left hand drive and number of digits, etc., are given indi-

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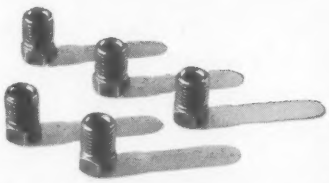

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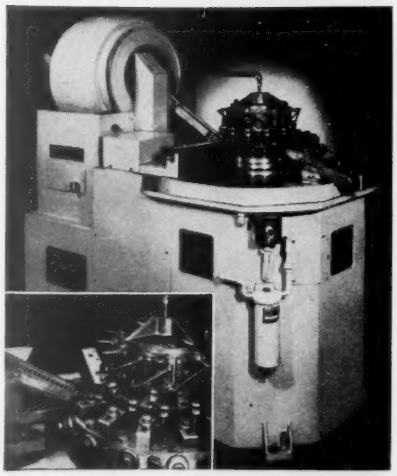

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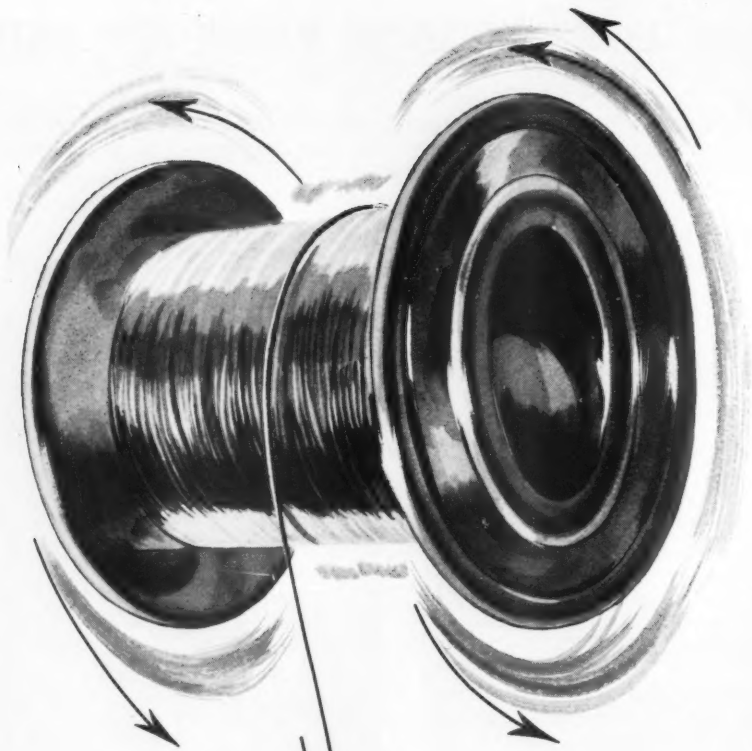

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vidual order numbers on the price list for ordering. Addresses of company regional sales offices if local consultation is necessary.

* * *

Catalog #200 will be sent free upon request by Durant Manufacturing Company, 1929 N. Buffum St., Milwaukee 1, Wisc.

New Tubing and Bar Stock Feeders

Two new drive units specially built to feed round tubing and bar stock are now available from **Magnaflux Corporation,** Chicago. Both units, engineered for rugged mill service, are designed primarily to work in conjunction with eddy current tests. This through-coil test equipment, also developed by Magnaflux, automatically locates defects in ferrous or non-ferrous products such as rod, wire, and seamless or welded tubing and pipe.

* * *

Type X-2316 handles diameters in a range from ¼″ to 4″. The variable speed drive, working through V-pulleys, offers speeds from 40 to 400 f.p.m., controlled by a "Forward-Neutral-Reverse" switch in combination with a potentiometer. The coil platform is rigidly supported and adjusts for fine alignment between coil and test part by means of a gear and screw thread arrangement.

* * *

Type X-2366 is smaller in size and accommodates diameters from ¼″ to 1½″. Its constant speed reduction motor, working through a V-pulley arrangement, offers 2-speed operation, either 180 or 300 f.p.m. Other speeds may be obtained by changing the pulley sizes.

New Low Temperature Jacketing Material for Military Introduced By Blane

A new low temperature vinyl jacketing material designed to meet the military specifications, JAN-C-17C, MIL-C-915A, and MIL-C-2194D, has been introduced by **The Blane Corporation,** Canton, Mass., manufacturers of vinyl and polyethylene compounds and color concentrates.

* * *

The new compound #312 is the latest member of the company's expanding line and represents continued research in the development of jacketing material for coaxial cable and navy shipboard cable. It has good flexibility, excellent retention of elongation after aging, exceptionally smooth surface and outstanding low temperature characteristics.

* * *

Further information on Compound #312 may be obtained by writing direct to The Blane Corporation, Canton, Mass.

Index to the Literature on X-Ray Spectographic Analysis

This is the first of a series of bibliographical surveys of the literature of X-ray spectographic analysis. It covers 211 references for the years 1913 through 1957, although it is admittedly not an exhaustive compilation. It contains an author index as well as abstracts and a subject index. The abstracts are largely quoted from Chemical Abstracts, but occasionally they are revised or specially prepared.

* * *

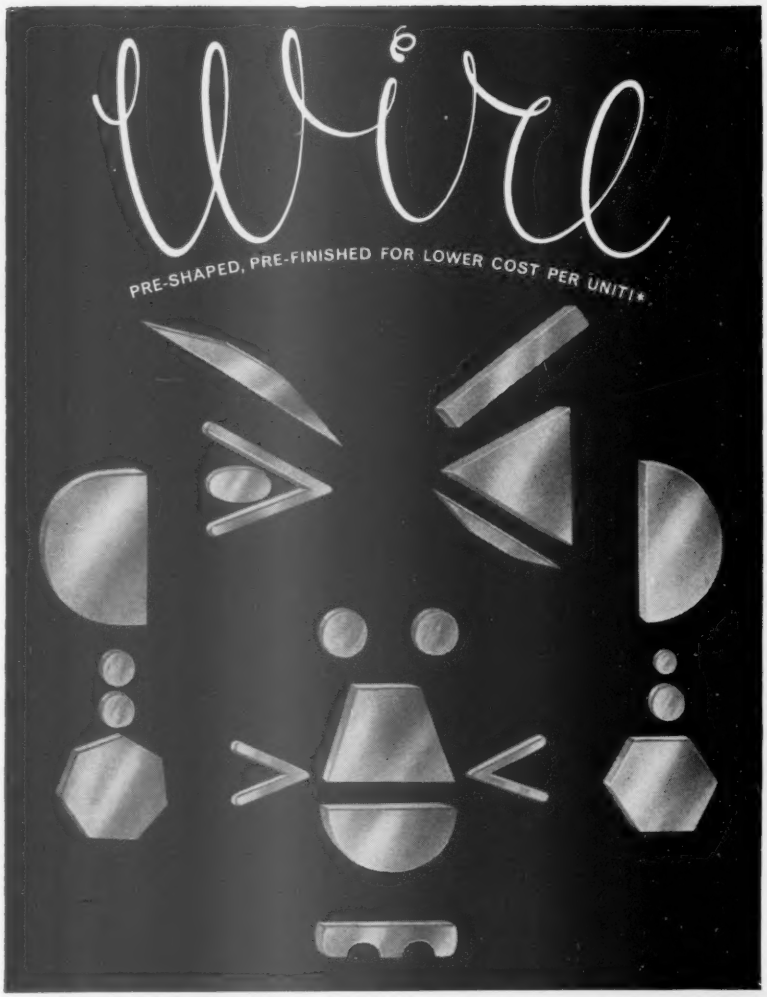
Copies of this book may be obtained from **American Society for Testing Materials,** 1916 Race St., Philadelphia 3, Pa., at $1.50 each.

Thompson Chemical Adds Vinyl Copolymers to Line

Thompson Chemical Company, 90 Mendon Ave., Pawtucket, R. I., has added vinyl copolymers to its rapidly expanding line of products. First products are Trulon 750 and Trulon 760. Other Trulon copolymer products are expected to be added as a result of the active research program being conducted by the company.

* * *

This move complements the company's recent introduction of Trulon 630, a low molecular weight polyvinyl chloride with high plasticizer absorption characteristics. Trulon 630 has already been found useful in the manufacture of molding compounds for electrical connectors and similar applications, and as a processing aid in the calendering industry.



*Examples shown are greatly enlarged cross-sectional views of selected standard and special shapes available

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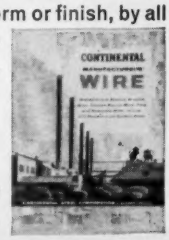

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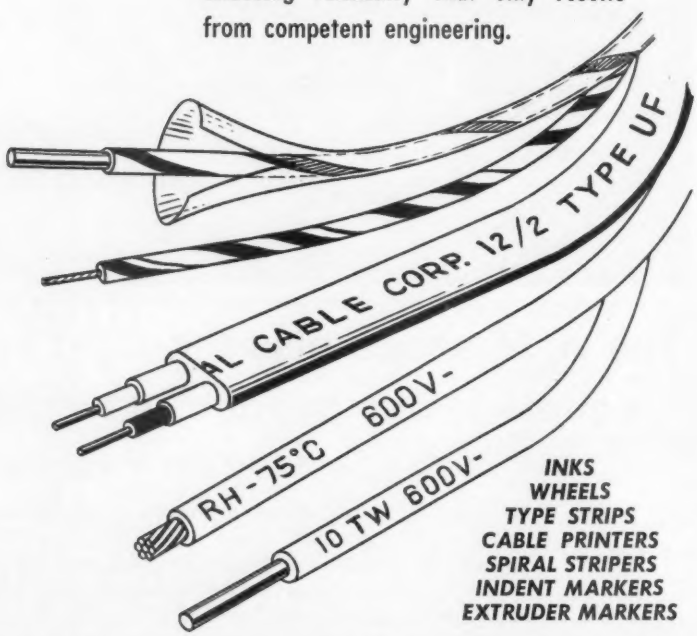

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Riverside-Alloy Opens New Offices

The location of a sales office in Cincinnati and the relocation of the Chicago district office were announced simultaneously by **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc., Riverside, N. J.

* * *

The new Cincinnati office is located at 3537 Epley Road and is headed by **Joseph Whinney.** The relocation of Riverside-Alloy's Chicago office was part of a consolidation of all Porter Division's district offices in the area. Effective March 31st, the address was changed to 2567 Greenleaf Ave., Elk Grove, Ill. It is under the direction of **Joseph A. Davis,** district manager.

New Method for Eliminating Drawing Compound from Small Diameter Tubing

The elimination of drawing compounds from small diameter tubing, down to the finest capillary tubes, has so far required several operations and was relatively expensive. It used to be done as follows:

* * *

After the cold-drawing process, the tubes or coils of tubing were first filled with inert gas by attaching the end of the tube to a valve connected to an inert gas conduit, and the gas streamed into the tube until the last traces of air were expelled. The inert gas remained inside the tube and prevented oxidation during the annealing process.

* * *

With this process it was not possible to eliminate drawing compounds which evaporated and got mixed with the inert gas. Of course, with increasing temperature, the inert gas in the tube expanded and a small part of the drawing compound vapors could escape into the annealing container and escaped into the atmosphere with the inert gas. However, the major portion remained in the tube.

* * *

When cooling down, the remaining drawing compound emulsion formed a dirty condensate inside the tube.

* * *

After annealing and cooling down, the inert gas was blown out of the tubing by means of compressed air.

* * *

With this method, it was not possible to obtain tubing with a bright finish on the inside, because the drawing compound vapors formed a deposit. For eliminating this deposit it was necessary to subsequently flush the tube with a pickling solution.

* * *

According to this system, three operations were required to eliminate the drawing compounds from small diameter tubing, namely:

1—filling the tubes with inert gas,
2—elimination of the inert gas from the tubing after annealing, by means of compressed air,
3—flushing of the tubing by means of a pickling solution.

* * *

By annealing under high vacuum, these three processes become superfluous and the drawing compounds are eliminated completely, even from the finest capillary tubing, simply and economically by the annealing process itself. This can best be explained as follows:

* * *

As is already known, the inside of the annealing hood, containing the tubing to be annealed, is put under high vacuum. When the drawing compounds evaporate from the inside of the tubing, these vapors are eliminated completely, even from the finest diameter tubing and are drawn off into the open continuously by means of a special pump. The annealed tubing inside the hood has a very bright inside as well as outside surface which meet the most exacting requirements.

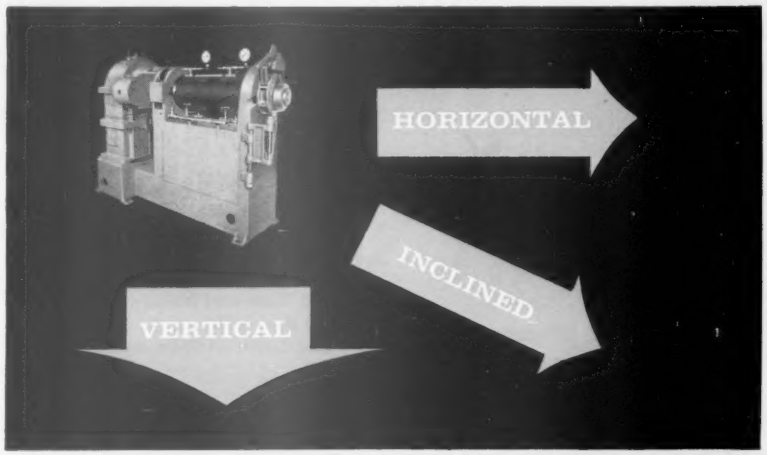
* * *

Bright annealing of capillary copper tubing is another illustration of the manifold and economical applications of the high vacuum bright annealing system. Such vacuum annealing plants were originally developed by the well-known manufacturers of furnaces: Braun-Angott, Hagen/West Germany and several hundred of such installations are presently being operated in all industrial areas of the world.

* * *

For additional information, write

DAVIS-STANDARD
CONTINUOUS VULCANIZING SYSTEMS



Whatever your CV requirements — you can't afford to overlook these Davis-Standard exclusives:

- Experience — More CV systems engineered and produced than any other manufacturer of extrusion equipment (both new plant layout and integrated systems for existing plants).
- Patented Thermatic Extruders with steam/water temperature control.
- Patented Pressure Roller Feeder.
- Patented Feeder Block.
- Patented Rotative-Flo Crossheads.
- Patented Water Level Control
- The leading supplier of proven CV Systems.

Ask Davis-Standard engineers to lay out and recommend a "MATCHED COMPONENT" system for your CV line.

See the Davis-Standard booth—Nos. 1428 & 1432—Plastics Show, New York Coliseum—June 5-9, 1961.

D-S thermatic

DAVIS-STANDARD
Division of
FRANKLIN RESEARCH AND DEVELOPMENT CORPORATION
16 WATER STREET, MYSTIC, CONNECTICUT

PRECISION EXTRUSION CONTROL IS OUR BUSINESS

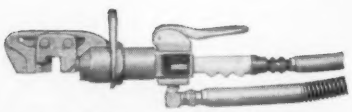
NEW DESIGN

MANCO Hydraulic Guillotine®

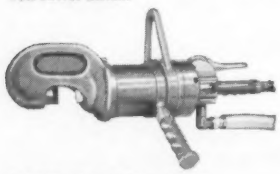
WIRE AND ROD CUTTERS

Big Capacity

FAST • EASY TO USE



MODEL MC 210 Capacity ½" High speed . . . ½ second per cut for steel rod to ½". Full swivel action.



MODEL MC 35 Capacity 1" Cuts high carbon material including reinforcing rod and heat treated chain to 1" diameter in 1¼ seconds per cut.

MODEL MC 65 Capacity 1¼" Cuts 1¼" diameter steel in 2 seconds per cut. Can be modified to cut 1⅜" diameter aluminum.

Big Time and Money Saver for Rod Mills and Users of Wire and Rod

Ideal for production cutting, trimming off cobbled ends, taking test samples and splitting bundles on docks.

Manco has completely redesigned the Guillotine line of wire and rod cutters now used by major rod mills throughout the world. These new Manco Guillotine units give high efficiency, heavy duty performance, with a 75% slash in tool maintenance costs.

New Interchangeable Blade and Anvil

Interchangeable blade and anvil means wear points can be reversed for virtually double life. Three blade styles for various cutting requirements. There is a new simplified valve design with hardened and ground parts for longer life. Also, new Meehanite piston with large bearing surface and a new piston seal assembly that permits quick replacement.

These Guillotine units powered by Manco Hi-Thrust Electric Hydraulic Pumps

Write for Complete Information W-5

WRITE FOR CATALOG

MANCO MFG. CO., Bradley, Illinois

Please send:

☐ Catalog of new Guillotine Wire and Rod Cutters.

Name .....

Firm .....

City ..... Zone ..... State .....

American Laubscher Corporation, 250 W. 57th St., New York, N. Y.

New Company Serves Ferrous And Non-Ferrous Wire Field

American Machinery Co., Inc., 39805 Mentor Ave., Mentor, Ohio, was recently formed by **George H. Perkins** to specialize in the designing and building of machinery and machine tools for the metal-working industries.

* * *

Mr. Perkins has been Chief Engineer for some of the larger heavy machinery builders and Project Engineer for a number of years with one of the largest mill facilities in this country. This experience covers plant layout, evaluation, feasibility study work on all types of mechanical processing and handling equipment as well as the designing and building of heavy machinery.

* * *

The new organization will pursue the following fields of endeavor:

Automation
Wire Reels
Spoolers
Drawing Machines
Draw Benches
Wire Mill Machinery
Tube Mill Machinery
Design Engineering
Plant Layout

* * *

The present organization is comprised of forty employees and has extensive building and fabrication facilities.

O'Neil Irwin Changes Name

O'Neil-Irwin Manufacturing Company, 635 Jefferson St., Lake City, Minn., has changed its name to **Di-Acro Corporation** effective immediately, it was announced by **Gunnar H. Danielson,** president.

* * *

The change was made because the Di-Acro brand name has been promoted through the years almost to the exclusion of our O'Neil-Irwin corporate name. The name, Di-Acro, pronounced "die-ack-ro", comes from the term "die-accuracy without dies" which was one of the company's early marketing themes. Products presently offered under the Di-Acro trade name are precision metalworking machines which bend, roll, notch, punch and shear metal in both sheets and bars.

Multiple Output Dielectric Test Set

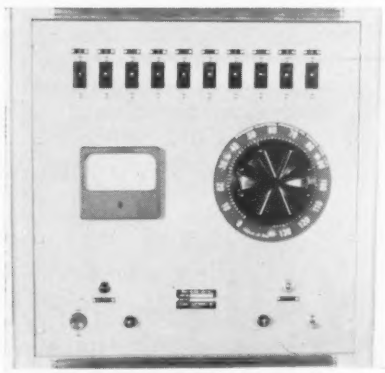
Designed to simultaneously test 10 reels of wire or cable in production plants, this new model K3-4Y speeds up production testing 10 fold, automatically disconnects faulty specimen and permits balance to remain on test.

* * *

It features independent fault indicator for each channel, optional timer for timed tests, zero start high voltage on hold push button, safety door interlock and external interlock, plus other usual convenience and safety features including a 3 conductor safety grounding cord and plug.

* * *

Rated at 0 to 3 KV/rms and 4 KVA capacity, the test set has a continuously adjustable output voltage, a linear scale kilovoltmeter



with field recalibration facility and 10 separate output terminals behind an interlocked door. All 10 outputs need not be energized if not required.

* * *

Other applications include the dielectric testing of multi-conductor cable, life tests on a group of components, specimens of insulatting material, and where the ratio of testing time to loading time is favorable.

* * *

Input is 115 volts, 60 cps, and 35 amps at full load. Size is 22″ x 15″ x 21″ high, and the weight is 220 pounds.

* * *

Peschel Model K3-4Y is priced at $1500.00 and delivery is 3-4 weeks. Other sizes available to order. For further details, write **Peschel Electronics, Inc.**, Towners, Patterson, N. Y.

For Fungus Resistance, Specify

TEXTILENE TWI-TAR

Offering great durability along with light weight, Textilene Twi-Tar is successfully used for buried communication cable (bedding and overall serving), expanded ACSR cable (expander between core and conductors), stationary power cable and portable cables.

Twitchell's superior Textilene line also includes: Moisture-resistant fillers — *Twi-Flex* and *Twi-Wax*. Used for non-metallic sheathed cable, maritime shipboard cable, varnished cambric cable.

Soft, dry fillers — *Twi-Port* and *Glascor** (Fiberglas-centered for high tensile strength without added bulk). Used for control, power, appliance, coaxial and communications cables, and all types of portable and flexible cords.

*Patent Applied For

For Every Wire and Cable Application
Twitchell's TEXTILENE Fillers Fill The Bill

Quality-controlled materials that are dependably uniform . . . in standard forms, or customized to special needs.

Initial low cost with savings added by production efficiency . . . flexible, ready-to-use fillers that fit all equipment, handle and form easily, always maintain desired shape.

Assured supply from a reliable domestic source . . . always available in economical and convenient packaging.

Proved performance as components of cables and wires that meet government specifications . . . stability shown by trouble-free installations in continuous service 20 years and longer.

FREE — SAMPLE SPOOLS of any type of Textilene filler to demonstrate the superiority of Twitchell materials in your operation—also technical counsel without cost or obligation. Just tell Twitchell your end-use requirements. *Write, wire, or phone today:*

E.W. TWITCHELL INC.

Third and Somerset Streets, Philadelphia 33, Pa. • REgent 9-7800

PAPER PRODUCTS FOR THE WIRE INDUSTRY

Twisted • Folded • Pressed • Crushed • Shaped • Braided • Woven

Outstanding Personalities of the Wire Industry

Fafnir

The Fafnir Bearing Company, New Britain, Conn., has announced the appointments of **George M. Cooley** as Senior Analytical Engineer and **Ronald D. Curtis** as Senior Project Engineer.

* * *

Mr. Cooley will specialize in the application of computers to the solution of analytical problems in bearing engineering. He is chemical engineering graduate of Worcester Polytechnic Institute. Mr. Curtis will continue to work in the expanding field of special-property bearing materials and their applications. He came to Fafnir in 1956 from the Bristol Machine Company where he was a designer and project engineer.

New Sales Executive For Jelliff Wire Mesh

Daniel W. Sullivan of Detroit has been named Assistant Sales

Daniel W. Sullivan

Manager of the Mesh Division of **The C. O. Jelliff Manufacturing Corp.** of Southport, Conn. Mr. Sullivan is a graduate of the University of Detroit and has had extensive experience in industrial sales, especially with woven-wire cloth and fabricated-mesh products. For the present he will work out of 4640 Audubon, Detroit 24.

Chemical Engineer Joins Amchen

Professor Willibald Machu, noted authority on metal-working conversion coating chemicals and finishes, has joined **Amchem S. A.,** a new wholly owned European subsidiary of **Amchem Products, Inc.,** Ambler, Pa., as patent attorney and special technical advisor-in-residence to Amchem's European licensees. Dr. Machu is a chemical engineer. He will make his headquarters in Vienna, Austria, where he will also engage in extensive research projects. Amchem manufactures chemicals for the metal-working industry and agriculture.

Thomas O'Connell Retires

Thomas F. O'Connell, Superintendent of Wire and Rod Mills, Scovill Manufacturing Company, Waterury, Conn., retired from active work on April 1, 1961.

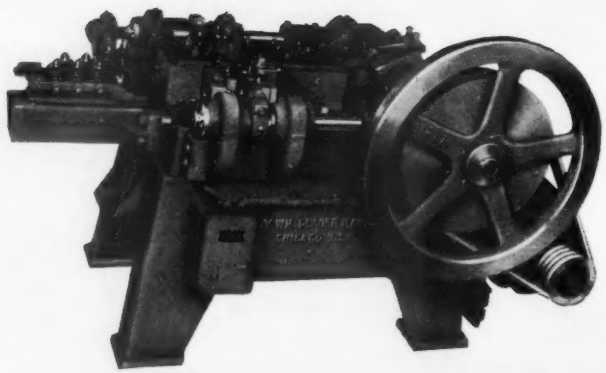
* * *

Long a member of The Wire As-

GLADER NAIL MACHINE

a NAME and MACHINE
that have stood for
DEPENDABILITY since 1887

our Nail Machine
"KNOW-HOW"
means $$$ for you



Wm. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

EXPORT DEPT. 122 EAST 42ND STREET • NEW YORK 17, N. Y.

sociation and a regular attendant of The Annual Convention, Mr. O'Connell has been a familiar figure at Association meetings.

* * *

He stated that over the years he has made numerous friends and has enjoyed the good fellowship of the annual meetings; it has been a pleasant association that he will miss. The rest of us will miss seeing Mr. O'Connell, too.

Appoints Technical Representative

Lawrence J. Kelly has been appointed a Technical Representative in the Metropolitan New York Region of **Union Carbide Plastics Company,** Division of Union Carbide Corporation. According to the announcement by **H. K. Phinney,** Regional Manager, Mr. Kelly will be responsible for the sale of Bakelite Brand vinyl, phenolic, and epoxy resins and compounds for bonding, laminating, and coating applications. He will be located in the Company's Clifton, New Jersey, District Sales Office, 1051 Bloomfield Avenue (PRescott 8-2900).

* * *

Mr. Kelly graduated from Villanova University in June, 1960, with a Bachelor of Science Degree in Chemical Engineering.

Sunbeam Appoints Vice President of Sales

Appointment of **Jonathan Smith** as Vice President of Sales of **Sunbeam Equipment Corporation,** Meadville, Pa., manufacturer of industrial heat treating furnaces, has been announced by **Vincent R. Troglione,** President. Mr. Smith was formerly Project Manager.

Jonathan Smith

Appointed to Insulating Materials Sales Post

Jack M. White has been named salesman in the **General Electric Insulating Materials Department's** Chicago sales office, according to an announcement by Sales Manager **T. D. Daniels.**

* * *

The department manufactures a broad line of electrical insulations, including mica products, coated materials, varnishes, wire enamels, and industrial paints.

* * *

Mr. White's sales territory will include Northern Illinois, Wisconsin, Northern Michigan, Minnesota, Iowa, South Dakota and Nebraska.

* * *

A graduate of Louisiana State University, he joined General Electric in 1951. His last assignment was with the Industrial Sales Operation in Philadelphia.

Marking Machines, Wheels & Inks

FOR INSULATED WIRE, TUBING AND PIPE—

Type AM — Illustrated has these features:

1 FINE VERTICAL AND HORIZONTAL ADJUSTMENTS PROVIDE PERFECT MARKING ON WIRES OF .010" TO 3.00" IN DIAMETER.

2 ACCOMMODATES FLAT, CONCAVE, OR SPECIAL WHEELS.

3 CAN BE DRIVEN BY ELECTRIC MOTOR OR SELSYN TRANSMITTER AND RECEIVER TO INSURE PERFECT PRINTING WITH MINIMUM PRESSURE.

Actual Production Photo of Type AM

Horizontal Adjustment

GEM GRAVURE CO., INC.
West Hanover, Massachusetts, U. S. A.
CABLE ADDRESS: GEMGRA
Telephone: ROCKLAND TRiangle 8-0456

IN THE MARKING OF EXTRUDED MATERIAL THERE ARE BIG ADVANTAGES IN ONE SINGLE SOURCE OF SUPPLY.
KNOW-HOW • INKS • WHEELS • MACHINES

West Coast Representative: Paul I. Kenner Co., 230 Shaw Rd., So. San Francisco, Calif.
West Germany: Walter G. Fritzke GMBH, AM Wehrhahn 94-96, Dusseldorf, W. Germany
Warbrick Engineering Specialties Limited, Barclays Bank Chambers, Sanky Street, Warrington, England.

CF&I Names Sales Assistant

Harry B. Smith has been appointed Assistant to the Sales Manager in **The Colorado Fuel and Iron's** Realock Fence Department. His headquarters will be in the corporation's Wickwire Building, Buffalo, N. Y.

* * *

Mr. Smith was serving as eastern regional manager at the time of his appointment. Previously he had been manager of sales and service for the New York District, assistant to the general manager of sales for the Buffalo District, and salesman for the Boston District. He joined CF&I in 1946 as administrative assistant in the Boston Office of the Realock Fence Department. Mr. Smith received his education at Harvard University's School of Business Administration.

* * *

At the same time it was announced that **Howard M. Dorward** has been appointed Product Sales Engineer of the Wire Rope Sales Department. He had been manager of Wire Rope Sales for the Rocky Mountain Division since 1948, having joined CF&I in 1946 in the Wire Rope Sales Department.

Named Product Manager of Aluminum Chain Link

Ralph Getzin has been named the first product manager of aluminum chain link fence "to reflect last year's breakthrough in sales of chain link and this year's estimates of still greater growth", **Nichols Wire & Aluminum Co.**, Davenport, Iowa, has announced.

Ralph Getzin

* * *

Prior to his appointment by the Nichols Company Mr. Getzin was Assistant Manager of Sales, Realock Fence Division of **The Colorado Fuel & Iron Corp.**, Buffalo, N. Y., with whom he had been associated for over 20 years.

* * *

Mr. Getzin will spearhead a special sales campaign on a national basis designed to make aluminum dominant in the chain link fence industry. **Frank R. Nichols**, President of the company, which pioneered the development, manufacture and sale of aluminum chain link fence, said, "The very rapid growth of aluminum chain link sales by all producers last year in the face of depressed economic conditions made it obvious that the turning point had been passed and that aluminum chain link has become the consumers' standard."

EST. 1855 AIMCO INC. 1915

"American" INSULATING MACHINERY COMPANY

TRADE MARK

FAIRHILL AND HUNTINGDON STREETS

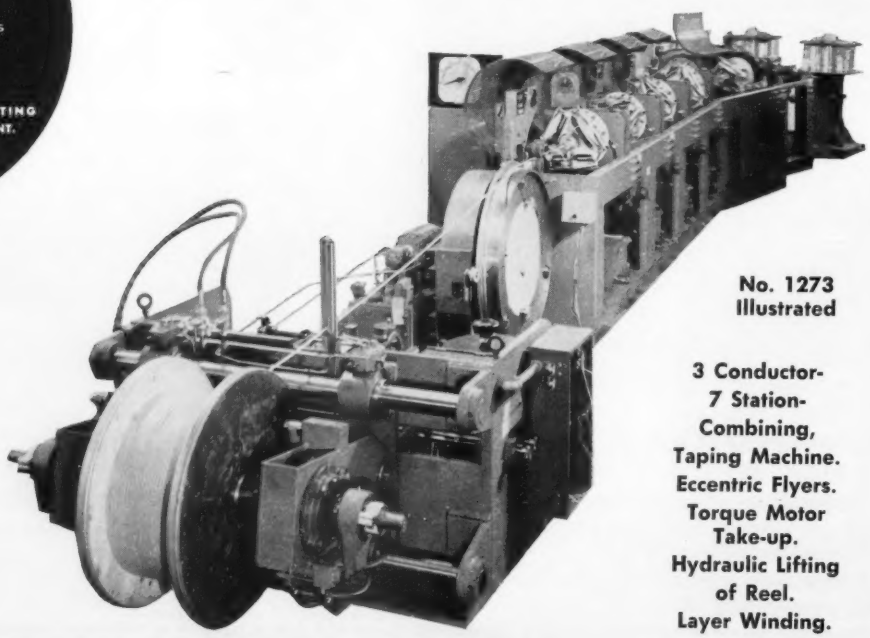
PHILADELPHIA 33 PENNSYLVANIA U.S.A.

MANUFACTURERS OF WIRE INSULATING MACHINERY AND ALLIED EQUIPMENT. MACHINERY MFG. TO CUSTOMERS SPECIFICATIONS.

High-Speed Taping Machines

High-Speed Insulated Wire Winding Machines

High-Speed Resistance Wire Winding Machines



No. 1273 Illustrated

3 Conductor-
7 Station-
Combining,
Taping Machine.
Eccentric Flyers.
Torque Motor
Take-up.
Hydraulic Lifting
of Reel.
Layer Winding.

ENAMELING MACHINES
TINNING EQUIPMENT
TAKE-UPS
PAY-OFFS
BARREL TAKE-UPS
SPOOLING EQUIPMENT
CONCENTRIC FLYERS
ECCENTRIC FLYERS
SPECIAL MACHINES

Names Manager of Electrode Line

James R. Robbins has been appointed product line manager of electrodes and brazing for the Westing-Arc Department of **Westinghouse Electric Corporation.**

* * *

Mr. Robbins began his career with Westing-Arc as a sales engineer in the Richmond, Va., territory. Prior to joining Westinghouse, he was vice president and general manager of Welder's Supply Corporation, Richmond, Va. His welding experience covers a period of nearly 15 years. He attended Duke University, and served as an Air Force fighter pilot in World War II.

Rea Names Sales Executive

Stewart R. Chapman has been named assistant sales manager, aluminum products, for **Rea Magnet Wire Company, Inc.,** subsidiary of Aluminum Company of America, it was announced by **James L. McKinley,** Rea sales vice president.

* * *

A member of the Rea organization in Fort Wayne since Feburary 1, Mr. Chapman had been with Alcoa's Sales Development Division at New Kensington, Pa., since 1953. He was a development engineer from 1953 to 1958, and subsequently served as manager of the electrical section of the Division until his recent move. He is a 1953 electrical engineering graduate of Texas A&M.

General Cable Appoints P.A.

The appointment of **Sidney W. Gabriel** as Director of Purchases has been announced by **J. R. MacDonald,** President and Chairman of the Board, **General Cable Corporation.**

* * *

Mr. Gabriel was formerly Assistant Director of Purchases and has been with the corporation for 35 years.

Sidney W. Gabriel

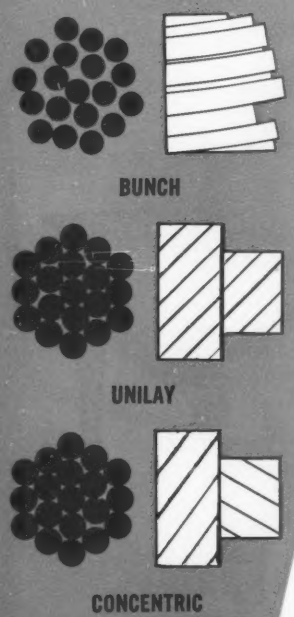
Crucible Steel Appoints Sales Director

Josef H. Buerger, Jr., has been appointed Director of Sales of the **Crucible Steel Company of America.** He will be responsible for all sales activities and will direct field sales through five regional managers and thirty-eight sales offices and warehouses. He will also supervise the managers of all product divisions.

* * *

Mr. Buerger joined Crucible Steel in October, 1960, and served as assistant to the Vice-President, Commercial. Before that he was Vice-President of Marketing with Yuba Consolidated Industries in

Which Wire Construction is Best . . .



Hudson makes all three in bare and plated constructions. Each is best suited for particular applications and insulating materials. For many years, the industry "standards" were bunch and concentric strandings. But with Hudson's marketing of unilay, there has been a strong swing to this versatile construction.

. . . for your Application

BUNCH constructions are generally used for flexible cords and fixture wires complying with UL standards, ASTM, and all military specs where permitted.

UNILAY constructions should be utilized where concentricity is a major requirement, or for economic reasons to get more for your insulating dollar. Since unilay constructions are preformed and twisted in the same direction, they are uniform and smaller in O.D. than bunched or concentric constructions. Unilay constructions are suited for all bunched applications, and are being substituted for concentrics in many applications with comparable performance at considerably lower conductor cost.

CONCENTRIC Where concentric strand conductors are required by customer or military spec, Hudson's concentric wires will meet the most exacting requirements.

For additional information on stranded and single-end conductors — bare and plated — write to:

HUDSON WIRE COMPANY
OSSINING DIVISION, OSSINING, NEW YORK / TELEPHONE: WILSON 1-8500

San Francisco, and earlier, Sales Manager of U. S. Pipe and Foundry Co. in Burlington, N. J. He holds a Bachelor of Arts degree from Princeton, University.

Lennan Joins Stanley-Humason

Geoffrey W. Lennan has been appointed sales representative for **Stanley-Humason, Inc.**, Forestville, Conn., a subsidiary of The Stanley Works in eastern Massachusetts, New Hampshire and Maine. For eight years he was administrative assistant in the sales department of **Wickwire Spencer Steel Division,** Palmer, Mass. He attended Clark University in Worcester and was graduated in 1950 with a degree in economics and business administration.

Noted Research Chemist Joins Alpha Metals

Daniel Gray, research chemist credited with changing indium from a laboratory curiosity to a commercial metal, has been appointed special consultant on technical problems by **Alpha Metals, Inc.**, Jersey City, N. J.

* * *

Before joining Alpha Metals, Mr. Gray was a research chemist with Oneida, Ltd., for 42 years. He occasionally undertook special projects such as the one on indium.

* * *

During World War II, he introduced large scale plating of cadmium, zinc and nickel as well as unusual types of plating involving silver on aluminum, silver on molybdenum steel to withstand high temperatures, and heavy gold plate. One of his achievements during this period was to silver-plate airplane bearings, which involved high-speed plating from concentrated solutions.

Daniel Gray

* * *

Through his research experience, Mr. Gray has become a specialist in the problems of tarnish and corrosion. His work involved much study of silver and silver alloys, metallurgy of silver alloys, diffusion of metals and electrodeposition of metals and alloys.

* * *

A graduate of Millikin University, Mr. Gray holds some 20 patents in the fields of electrodeposition, alloys, abrasives and packaging materials. He is the author of a number of papers on indium plating, trace impurities in silver and electropolishing.

To Sell GE Silicones

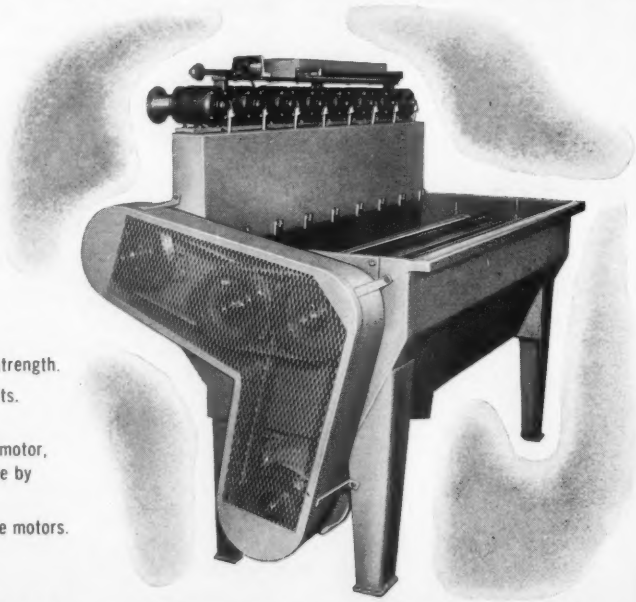
Edward F. Coakley has been named sales representative for the

STRAIGHT-ROLL WIRE DRAWING MACHINE

8 HEADER • 14 PASS • 1250 FPM • RUGGED • COMPACT • NO VIBRATION

The Watkins STRAIGHT-ROLL WIRE DRAWING MACHINE

Compact basic design, rugged construction and design detail for maximum rigidity give this machine the ability to handle 8 heads, each having 14 passes and a finishing die, at a wire speed of 1250 FPM and higher within a floor space of 40" x 77" without vibration.



ROLLS	Two drive rolls, one capstan roll in close-coupled arrangement. 5" diameter. Easy removal.
TUB	All-welded construction. Heavy plate.
SHAFTS	2" diameter. Journaled in heavy duty flange-type ball bearings. Shaft seals in tub walls.
DIE HOLDER	Extra-heavy construction for maximum rigidity and strength.
MAIN DRIVE	7.5 HP 220/440 Volt electric motor. Double vee belts. Removable guard.
TRAVERSE	Travel is adjustable from 3" to 6". Gearhead servo motor, controlled by limit switches, actuates traverse frame by rack and pinion drive. Mechanism enclosed.
SPOOLING	Finished wire led to spools on shafts of eight torque motors. Individual ON-OFF and speed controls.

R S WIRE MACHINES

R. S. WATKINS & SONS, INC. Glen Road, Sandy Hook, Conn.

New England District of **General Electric's Silicone Products Department,** Waterford, N. Y. His office address will be 145 North Beacon St., Boston.

* * *

Mr. Coakley received a B.S. Degree in chemistry from Boston College in 1957. Following completion of his studies, he was associated with the B.F. Goodrich Company until October, 1960. He joined the Silicone Products Department of General Electric the same month and until his present assignment has been undergoing sales training.

Appoints Technical Sales Representative

John B. Honish has been appointed a Technical Representative in the South Atlantic Sales Region of **Union Carbide Plastics Company,** division of Union Carbide Corporation. According to the announcement by **V. L. Larson,** Regional Manager, Mr. Honish will be responsible for the sale of Krene brand vinyl film and sheeting and Bakelite brand polyethylene, vinyl, phenolic, and styrene resins and compounds for molding and extrusion applications. He will be located in the Company's Greensboro, N. C., District Sales Office in the Guilford Building.

* * *

Mr. Honish is a graduate from Lycoming College where he received a Bachelor of Science Degree in Business Administration in 1959. After six-months military service, he joined Union Carbide Plastics Company and recently completed a training program at at the Bound Brook, N. J. plant.

Beliveau Advanced by Bridgeport Brass

Paul J. Beliveau has been named to a new position of administrative assistant to **Frank J. Cunnane,** vice president and plant manager of Bridgeport Brass Co. **Norman O. Mason** was named general supervisor of the Rod and Wire Mill and **Francis J. Feeney, Jr.,** supervisor of standards.

Appointed Sales Manager Industrial-Appliance Wire Products

P. W. O'Malley, Vice President and General Manager of the Wire and Cable Division, **Essex Wire Corporation,** has announced the appointment of **Jack Gerber** as Sales Manager, Industrial-Appliance Wire Products.

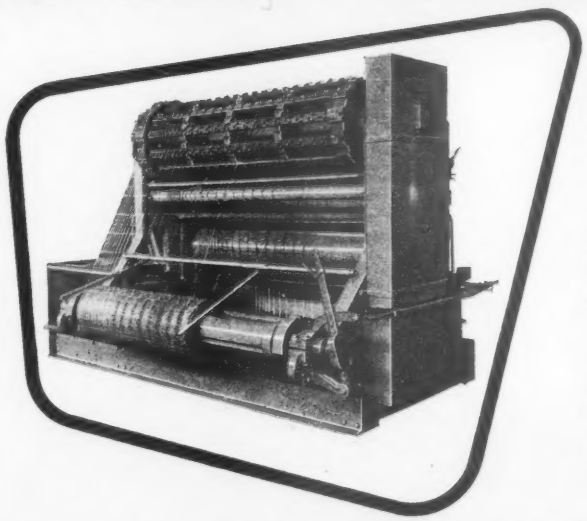
* * *

Mr. Gerber will be responsible for the marketing and distribution of the complete line of Cords Limited cord sets assisted by **Lee Bassill** who will be in charge of inside sales. Mr. Gerber will likewise be in charge of Essex industrial, appliance, automotive and specialty wires and cables, assisted by **Arthur Hein** who will be in charge of inside sales.

* * *

This newly created function, to be centrally located at Sycamore, Illinois, will coordinate the sales and customer service rendered by both the Essex Industrial Wire and

Interlocking FENCE LOOMS



- Fastest—Most Efficient
- Preferred by Leading Mills
- Low Maintenance Cost
- Wrapped Stay Fence
- Straight Stay Wires
- Integrated—Space Saving
- Replaceable Main Bearings
- Single or Double Strands
- Years of Low Cost Production

Write for Detailed Information — Without Obligation

Interlocking Fence Co., Box 8, Morton, Ill.

SPECIALISTS IN FENCE LOOMS

Cords Limited sales functions.

* * *

Well qualified for this responsibility, Mr. Gerber has been active in various capacities in the electrical industry for the past 23 years, having served as Chicago District Sales Manager, Western Sales Manager, Plant Manager, Hazelton, Penn., and General Manager, Wire and Cable Division of the Electric Autolite Company.

Promoted by Crucible Steel

M. J. Day, Vice President, Commercial, **Crucible Steel Company of America,** has announced the appointment of **D. W. Kaufman** as Product Manager of Stainless Steels. In this new capacity, Mr. Kaufman also will be responsible for vacuum melted high temperature alloys, super alloys and titanium.

* * *

Mr. Kaufman joined Crucible after his graduation from Pennsylvania State College with a degree in Metallurgy in 1940. Beginning in Crucible's Harrison, N. J. Research Lab, he moved to the Sanderson-Halcomb Works in Syracuse, N. Y., in 1941. After a series of metallurgical positions of increasing responsibility, he was moved to Crucible's Central Metallurgical Department in Pittsburgh in 1950.

* * *

During Crucible's joint ownership of **Rem-Cru Titanium, Inc., Mr. Kaufman** served with that company from 1953 to 1957, advancing from Assistant Sales Manager to Manager of Marketing. When Crucible acquired complete ownership of Rem-Cru Titanium, he was appointed Product Manager of the Titanium Division. In 1958, he assumed responsibility for sales of Vacuum Melted Products, and in 1959, he became Product Manager of Tool Steels.

Named Texas Division General Manager

Earle B. Barnes has been promoted to general manager of the Texas Division of **The Dow Chemical Company** at Freeport, Texas.

His promotion was announced by **Dr. A. P. Beutel,** vice president in charge of Dow's Gulf Coast operations.

* * *

At the same time, Dr. Beutel announced the promotion of **David L. Rooke** of the Texas Division Executive Department staff, to the newly created position of assistant to the vice president.

Appointments Announced By Weston

Appointment of **Ralph L. Shapcott** as Director of Manufacturing and Assistant General Manager of **Daystrom, Inc.,** Weston Instruments Division, Poughkeepsie, N. Y., was announced by **Russell A. Schlegel,** Vice President and General Manager.

* * *

The Poughkeepsie plant, located at 229 Manchester Road, produces recording, controlling, and electronic gauging instruments for general industry.

* * *

Mr. Schlegel also announced the

the latest HIGH SPEED
TUBULAR STRANDING MACHINE
from HANSON & EDWARDS . . .

. . . for the cable and wire rope industries.

* External wire guides increase efficiency—reduce "down-time"—provide quick, easy threading.
* Overall dimensions reduced—increased speed.
* Electro-mechanical or electrically operated air brakes to choice.
* Rotor runs in large split roller bearings.
* Direct gear-driven capstan gives positive lays.

19-12½ bobbin machine, one of the new models now in production. The capstan unit, with cantilever mounted haul-off sheaves, is a complete separate unit coupled by shaft and flexible coupling to the main machine.

HANSON & EDWARDS LTD
WARRINGTON ENGLAND
SALES ORGANISATION:
JAMES DAY (MACHINERY) LTD 28 MADDOX STREET LONDON W1

U.S. AGENTS:
THE EDMANDS COMPANY 860 WELLINGTON AVENUE CRANSTON 10, R.I.
P5078

appointment of James W. Harte, Jr., as Service Division Manager of the division. He will be responsible for the field service operations of the Poughkeepsie plant line of recorders, controllers, and gauge products.

Michigan Oven Names Three

Three key appointments at the **Michigan Oven Company** here have been announced by **LeRoy M. Gill**, President.

* * *

Graham G. Barton, formerly Michigan Sales Representative for the company, has been promoted to Vice President. A graduate of the Detroit Institute of Technology, he has been with the company since 1950.

* * *

Jerry E. Gibson replaces Barton as Engineering Sales Representative for MOCO in the Michigan area. He joined the firm in 1952 as a senior draftsman, and served most recently as Chief Estimator.

Mr. Gill also announced the appointment of the **Noble Equipment Co.,** LaGrange, O., as the firm's sales representative in the Ohio area, with **C. E. Noble** in charge. A veteran of 26 years in the industrial oven and furnace field, Mr. Noble will make his offices in LaGrange.

Sequoia Names Chief Engineer

Eugene A. Christian, Jr., has been named chief engineer of the **Sequoia Wire & Cable Co.,** a wholly-owned subsidiary of the **Anaconda Wire & Cable Co.** He joined Anaconda Wire & Cable at the Hastings-on-Hudson plant in 1956 as a cable engineer.

CF&I Sales Appointments

Jack Driggs has been appointed Manager of Wire Rope Sales for **The Colorado Fuel and Iron Corporation's** Western Division, according to **F. A. Jones,** vice president in charge of sales, and **J. N. Counter,** general manager, Commercial Steel Sales, Western Division.

* * *

Mr. Driggs had been Wire Rope Sales manager for the Mid-Continent Division since 1951. Prior to joining CF&I in 1948 as a salesman for the Odessa, Texas district, he was associated with Lucey Products and Jones and Laughlin.

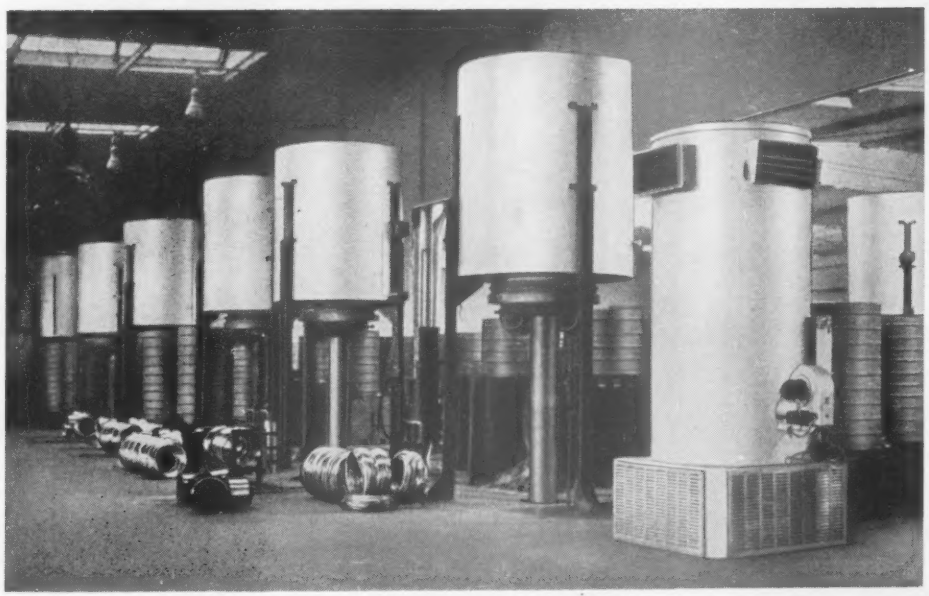
Elected Vice Pres. of Townsend

H. C. Kornman, former assistant general manager of the **Engineered Fasteners Division** of Townsend Co., was named vice president and general manager of that division. He succeeds **R. E. Casner** who recently resigned. **P. F. Barry,** recently appointed assistant sales manager, assumes the duties of sales manager. **Malcolm Wilson,** former plant engineer at Ellwood City, Pa., has been appointed plant manager there.

To Sell Tool Steels for Crucible

M. J. Day, Vice President, Commercial, **Crucible Steel Company of America,** has announced the ap-

Now also for Stainless and Chrome-Nickel!



FRITZ - VACUUM FURNACES HELP TO SOLVE YOUR ANNEALING PROBLEMS.

(German and Foreign Patents)

★

SOLE REPRESENTATIVE:

PAUL REICHER
Machinery & Equipment
600 Eglinton Ave., East,
Toronto 12, Ont., Canada

WRITE TO: FRITZ INDUSTRIAL FURNACES HAGEN, P. O. B. 448 (W.-GERMANY)

pointment of **Henry A. Sturm** as Product Sales Manager of Tool Steel. Mr. Sturm was previously Manager of the New England Region, and in that capacity, responsible for mill and warehouse sales of all Crucible products in the New Haven, Providence, Springfield and Boston Branches.

REA Approves Riverside-Alloy Lashing Wire

Stainless steel lashing wire, produced by **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc., has been approved by the Rural Electrification Administration. The wire was reviewed by the Administration's Technical Standards Committee.

* * *

The two sizes of Type 430 stainless steel cable lashing wire approved were .045″ and .061″. Catalog number RA4512 was assigned to the .045″ wire, which is put up on 1200 foot coils, and number RA6165 was assigned to the .061″ wire, which will be in coils of 650 feet.

* * *

The division is accepting orders for the approved lashing wire, effective immediately. A price schedule was published and has been made available upon request by writing: Publications Section, Riverside-Alloy Metal Division, H. K. Porter Company, Inc., Riverside, New Jersey.

Ernest Edgar Thum

Ernest Edgar Thum, 76, director of editorial services of the **American Society for Metals,** Metals Park, Ohio, died suddenly on April 10, 1961, in Coronado Beach, California, where he was vacationing with his wife. Funeral was held in Cleveland Heights, on April 14th.

* * *

Mr. Thum was editor in chief of Metal Progress, the Society's monthly magazine, and its first editor when the magazine was established in 1930. He was named editor in chief in 1958. Only a month ago he had been appointed director of editorial services in charge of all Society periodical and reference publications.

* * *

He was an international authority on metallurgy, widely known in Europe where he had made many trips in behalf of the Society and Metal Progress. He numbered among his friends many of the leading engineers and scientists in Great Britain, France, West Germany, Italy, and in Japan.

* * *

Before joining the Society he had been principal associate editor of The Iron Age. His varied professional career also included the associate editorship of Metallurgical and Chemical Engineering, and professor of metallurgy at the University of Cincinnati.

SEE THE DIFFERENCE YOURSELF...
BETWEEN JUST ANY SPOOL AND
Superior MPS
NO-CREV SPOOLS
No-Crev Spools eliminate the conventional crevice at the inner junction of spool head and barrel. No more production slow-ups due to fine wires getting caught in such a crevice. You can now have continuous trouble-free high speed winding.
We invite your inquiries — let us tell you more about No-Crev Spools. Write us today.
MPS
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give you brute strength with dimensional precision, concentricity, and balance. Another patented MPS development engineered to help you!
Mossberg PRESSED STEEL Corporation
DIVISION OF WANSKUCK CO.
18 WEST ST., ATTLEBORO
MASSACHUSETTS, U. S. A.
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#108

H. F. Sanderson

Frederick A. Power & Sons (Saltley) Ltd., Birmingham 8, England, announce with regret the passing of **H. F. Sanderson**, the company's wire mill manager, who died on March 27, 1961, following a heart attack. Mr. Sanderson had been a member of The Wire Association since 1957.

Sidney Rolle

Sidney Rolle, 77, of Princeton, N. J., died as the result of an accident on March 25 while motoring through France. Mrs. Rolle, who was critically injured in the mishap, was hospitalized in Avranches, France, but died shortly thereafter.

* * *

Mr. Rolle, who had been associated with The American Metal Company Ltd. for 44 years, retired in 1954 and since then had been a consulting metallurgical engineer.

* * *

He was a graduate of the School of Mines, Columbia University. After four years with a copper company in South America, he joined the United States Metals Refining Company, a subsidiary of The American Metal Company, holding jobs successively as draftsman, engineer, metallurgist and business manager. In 1930 he went with another of the company's subsidiaries, The Scomet Company, of which he was Assistant Manager.

* * *

He was an active member of The Wire Association, having served as director and on various committees. He belonged also to The American Institute of Mining and Metallurgical Engineers, The Mining and Metallurgical Society and The American Society for Testing Materials. In 1951 he was The Wire Association's Mordica Memorial Lecturer.

* * *

Mr. Rolle's trip abroad was a combination of business and pleasure and it is with keen regret that his untimely passing is noted. The country has lost a distinguished and able citizen.

John Edward McAuliffe

John Edward McAuliffe, founder and Chairman of the Board of the **Triangle Conduit & Cable Co., Inc.**, of New Brunswick, N. J., died on March 11, at his winter home in Palm Beach, Fla. He was 69 years old.

* * *

Mr. McAuliffe's death after a lengthy illness ended a career in sports, politics, and industry that covered almost half a century. He founded Triangle in 1916 which grew to a four-plant operation, grossing over 60 million dollars in sales in 1959. He was also Chairman of the Board of **Triangle Conduit & Cable (Canada) Limited.**

* * *

Triangle is one of the nation's large producers of metallic and non-metallic electrical conduit and a major producer of electrical wire and cable, copper tubing, plastic and bituminous fiber pipe and conduit, copper rod and brass products and marking inks with plants in New Brunswick, N. J.; Moundsville, W. Va. and Landisville, N. J.

CREWE'S ZOO

MUSIC *Wire*

Phosphate coating gives smoother surface, inhibits rust, and facilitates fabrication of springs. Also produced with electro plated zinc coating to withstand up to 100 hour salt spray test. Sizes .015" to .072".

MARYLAND FINE STAINLESS WIRE

Aircraft Cord
Braiding
Brush
Ceiling
Cold Heading
Fish Leader
Flexible Shaft
Forming
Heddle
Hook & Eye
Hose Reinforcing
Knitting
Lashing
Nail
Pin
Redraw
Reed
Rope
Sponge
Spring
Weaving
Welding

When you need any of these wires you need Maryland Fine quality and service.

Wire PHONE OR WRITE

NOrmandy 6-2500

MARYLAND FINE & SPECIALTY *Wire* CO., INC.

MAIN OFFICE AND PLANT • COCKEYSVILLE, MARYLAND

A Review of Recent Wire Patents

The data listed below is only a brief review of recent patents pertinent to the readers and subscribers of this publication.

Complete copies of these patents may be obtained by writing to the publisher of this magazine and remitting 50¢ for each copy desired. For orders received from outside the United States the cost will be $1.00 per copy.

No. 2,973,552, APPARATUS FOR WIRE MANUFACTURE, patented March 7, 1961, by Richard M. Downing, Woodstown, N.J., Louis T. Staats, Jr., Lewisville, Pa., and Nathaniel C. Wyeth, Hockessin, Del., assignors to E. I. du Pont de Nemours and Company, Wilmington, Del., a corporation of Delaware.

More specifically, the apparatus is for the manufacture of electrical wire conductors having a coating of expanded cellular plastic material and includes an extruder, a die, a pressure chamber into which the coated electrical wire conductor passes upon emergence from the die, there being a seal at the remote end of the pressure chamber having a central aperture which is radially adjustable through which the coated conductor is discharged without dissipating the fluid pressure in the pressure chamber, this radial adjustment permitting regulation at all times of the distance between the coated electrical wire conductor and the components of the seal encircling same.

* * *

No. 2,973,571, CURRENT CONDUCTOR, patented March 7, 1961 by Jan Laurens Meyering, Eindhoven, Netherlands, assignor, by mesne assignments to North American Philips Company, Inc., New York, N. Y., a corporation of Delaware.

The conductor has a central portion consisting of either iron, chromium, nickel, cobalt, titanium, zirconium or mixtures thereof and a layer of gold adjacent and surrounding the central portion, a layer of silver adjacent and surrounding the gold layer and a second layer of gold adjacent and surrounding the silver layer.

* * *

No. 2,973,706, WIRE-STAMPING AND CUTTING MACHINE, patented March 7, 1961 by Lewis A. Kingsley, Beverly Hills, Calif. (c/o Kingsley Stamping Machine Co., 850 Cahuenga Blvd., Hollywood 38, Calif.)

There are 10 claims in this patent for a machine for pulling wire through a wire cutting device and for stamping identifying characters at spand distances along the wire as it is being pulled through the cutting device.

* * *

No. 2,973,763, BRASSIERE WIRE FRAME, patented March 7, 1961 by Ross Frederick Rowell, 738 Marin, Montreal, Quebec, Canada.

The frame consists of a single length of resilient wire.

* * *

No. 2,973,911, METHODS OF HANDLING WIRE, patented March 7, 1961 by Vincent A. Rayburn, Baltimore, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

A coating of a hard, frangible, brittle, shatterable material consisting of rosin or shellac, in a liquid state is applied to a bare metal wire which is thereupon wound into a coil having an exposed end; then dried in situ to its hard, frangible state so that the hardened material temporarily binds convolutions of the coil together into a self-supporting coil, the wire of the coil being protected from corrosion by the coating material; and subsequently, when it is desired to use the wire, it is unwound by pulling the exposed end of the wire away from the coil, the coating material being such that, as the wire is unwound, a major part of the coating material shatters and drops off the wire as the wire is pulled away from the coil, leaving the wire in a reasonable clean condition.

* * *

No. 2,973,912, METHOD OF AND APPARATUS FOR COILING FILIMENTARY MATERIALS, patented March 7, 1961 by Julian E. Wilburn, Parkville, Md., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

The method comprises connecting adjacent ends of a number of lengths of filamentary material together to form one length, rendering the connections radioactive, advancing the formed length of material along its longitudinal axis, coiling the advancing material, detecting the radioactive connections, and controlling the coiling of the material in response to the detection of the radioactive connections. Twenty-two claims.

* * *

No. 2,973,915 WIRE REEL CONSTRUCTION, patented March 7, 1961 by David I.

AMERICAN IRON AND STEEL INSTITUTE
150 EAST FORTY-SECOND STREET, NEW YORK 17, N. Y.

AIS 10

SHIPMENTS OF STEEL PRODUCTS
ALL GRADES INCLUDING CARBON, ALLOY AND STAINLESS
(NET TONS)

JANUARY - 1961
Month

Covering Net Shipments (Excluding Shipments to Members of the Industry for Conversion into Further Finished Products or for Resale)

STEEL PRODUCTS		CURRENT MONTH 1961					YEAR TO DATE 1961					
	I	CARBON	ALLOY	STAINLESS	TOTAL	Percent of Total Shipments	Prior Year (1960) Percent of Total Shipments	CARBON	ALLOY	STAINLESS	TOTAL	Percent of Total Shipments	Prior Year (1960) Percent of Total Shipments
Ingots and steel castings	1A	6,523	6,868	1,260	14,651	0.3	0.7						
Blooms, slabs, billets, sheet bars	1B	49,229	24,673	1,440	75,342	1.6	2.6						
Tube rounds	1C	405	461	-	866	-	-						
Skelp	2	15,508	-	-	15,508	0.3	-						
Wire rods	3	56,686	1,736	847	59,269	1.3	1.6						
Total Semi-Finished		128,351	33,738	3,547	165,636	3.5	4.9						
Bars-Hot rolled(incl. light shapes)	14	339,114	93,680	2,874	435,668	9.4	10.4						
Bars-Reinforcing	15	141,313	106	-	141,419	3.1	2.2						
Bars-Cold finished	16	67,892	13,421	4,204	85,517	1.8	2.1						
Tool steel	17	655	5,494	-	6,149	0.1	0.1						
Total Bars and Tool Steel		548,974	112,701	7,078	668,753	14.4	14.8						
Standard pipe	18	142,570	225	-	142,795	3.1	3.5						
Oil country goods	19	80,407	24,735	-	105,142	2.2	2.4						
Line pipe	20	177,439	74	-	177,513	3.8	3.4						
Mechanical tubing	21	30,975	13,926	307	45,208	1.0	1.2						
Pressure tubing	22	13,849	2,595	1,551	17,995	0.4	0.3						
Total Pipe and Tubing		445,240	41,555	1,858	488,653	10.5	10.8						
Wire-Drawn	23	155,015	2,611	1,767	159,393	3.4	3.6						
Wire-Nails and staples	24	23,185	-	1	23,186	0.5	0.5						
Wire-Barbed and twisted	25	4,263	-	-	4,263	0.1	0.1						
Wire-Woven wire fence	26	8,269	-	-	8,269	0.2	0.1						
Wire-Bale ties and baling wire	27	2,183	-	-	2,183	0.1	0.1						
Total Wire and Wire Products		192,915	2,611	1,768	197,294	4.3	4.4						
Black plate	28	40,137	-	-	40,137	0.9	0.7						
Tin and terne plate-Hot dipped	29	23,281	-	-	23,281	0.5	0.4						
Tin plate-Electrolytic	30	513,675	-	-	513,675	11.1	5.9						
Total Tin Mill Products		577,093	-	-	577,093	12.5	7.0						
Sheets-Hot rolled	31	470,253	13,162	1,582	484,997	10.4	11.8						
Sheets-Cold rolled	32	858,576	2,787	10,637	872,000	18.8	18.9						
Sheets-Galvanized	33	202,622	62	-	202,684	4.4	3.8						
Sheets-All other metallic coated	34	18,117	-	-	18,117	0.4	0.4						
Electrical sheets and strip	35	1,309	39,977	-	41,286	0.9	0.8						
Strip-Hot rolled	36	79,814	1,185	504	81,503	1.8	1.9						
Strip-Cold rolled	37	75,416	994	12,530	88,940	1.9	1.9						
Total Sheets and Strip		1,706,107	58,167	25,253	1,789,527	38.6	39.5						
Total Shipments (1961)		4,305,562	290,115	42,293	4,637,970	100.0	xxx						xxx
Total-Prior Year (1960)		7,779,223	579,376	71,097	8,429,696	xxx	100.0					xxx	

3761

Elow, New Rochelle, N. Y., assignor to Consolidated Spring Corporation, Brooklyn, N. Y., a corporation of New York.

The reel is constructed of wire or light rod material there being a pair of similar, symmetrically disposed reel halves, each half comprising a number of similar, circularly arranged members, each made of a single piece of wire.

* * *

No. 2,974,326, SPRING INSERT FOR SPRING ASSEMBLIES, patented March 14, 1961 by George W. Ross, Brighton, Mass., assignor to The United States Bedding Company, St. Paul, Minn., a corporation of Minnesota.

More specifically the invention resides in a spring insert for reinforcing the periphery of bed spring assemblies in which all component parts cooperate, it is said, with each other regardless of the point of application of the load in the spring assembly.

* * *

No. 2,975,531, SAFETY WIRE SIMULATOR, patented March 21, 1961 by George Malenich, Binghamton, N. Y., assignor to General Precision, Inc., Wilmington, Del., a corporation of Delaware.

A device for simulating the breaking of frangible element, such as wire is disclosed, comprising a magnet and an armature for the magnet constituting a magnetic circuit, a support rigidly supporting the armature, hand operated means attached to the magnet for separating the magnet and the armature upon the application of a force, spring biasing means, and a device including a retaining element cooperating with the armature and with the spring biasing means to assure the restoration of the magnetic circuit promptly and automatically upon the removal of the force. There are 10 claims.

* * *

No. 2,975,991, STRIP TENSION CONTROLLER, patented March 21, 1961 by Mathias Michel, Walnut Creek, Calif., assignor to Kaiser Aluminum & Chemical Corporation, Oakland, Calif., a corporation of Delaware.

A tension controller in a rewind system for uncoiling and coiling strip material is disclosed.

* * *

No. 2,976,895, WIRE CUTTING AND ORIENTING APPARATUS, patented March 28, 1961 by Raymond E. Durham, Jr., Vestal, N. Y., assignor to International Business Machines Corporation, New York, N. Y., a corporation of N. Y.

The wire is gripped, rotated, oriented, formed into a loop and cut to proper length. There are 17 claims.

Catalog of Complete SECO Line

A new 16-page catalog on steel-processing equipment is announced by **Steel Equipment Company**, P.O. Box 737, Cleveland 22, Ohio. The catalog describes integrated slitting lines, cut-to-length (shear) lines, coil-handling equipment, strip mills and processing lines for rolling, cleaning, pickling and coating steel strip and non-ferrous metals, and equipment for wire drawing and flattening. The new catalog, with over 50 illustrations, presents an impressive array of steel-processing equipment—designed to meet the needs of the largest steel-working plant or the medium-size steel warehouse, fabricator, or manufacturer.

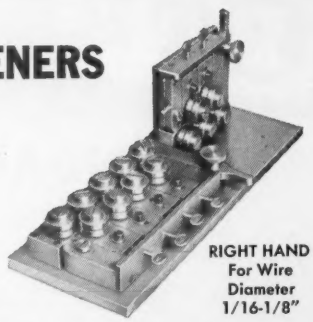
* * *

The SECO catalog describes both box-type and rotary-eccentric-type slitters, uncoilers, and recoilers; auxiliary equipment, such as coil up-ender, and scrap winder or chopper. The catalog describes strip levelers, pinch-rolls, up-cut and down-cut shears, scale breakers, scrubbers, stitchers and welders, bridle rolls, wire-drawing machines, vertical and horizontal block take-up frames for multiple-strand galvanizing and patenting line, wire spoolers, wire flattening mills, and narrow-strip rolling mils.

* * *

SECO is the exclusive builder of vertical coiling equipment for the remarkable Lee-Wilson loose-coil annealing process, also described in the catalog.

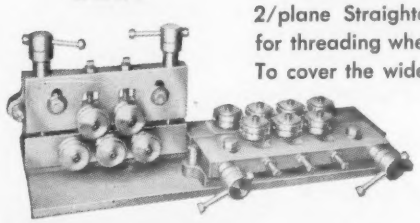
Sjogren 2 PLANE ROLL STRAIGHTENERS



RIGHT HAND
For Wire
Diameter
1/16-1/8"

Sjogren Two Plane Roll Straighteners are fully ball bearing for heavy production duty. They are designed to accommodate all sizes and grades of round or shaped wire whether it be high carbon, low carbon or copper, as well as the many alloys, from .010" to .375". Once set for the job at hand Sjogren 2/plane Straighteners may be opened and closed for threading when making coil changes without effecting the adjustment of the setting. To cover the wide range of wire diameters there are several size groups manufactured with either left or right hand direction. Each is individually produced to exact specifications for the grade, size and type of wire to be processed. Sjogren Two Plane Roll Straighteners do their duty each day, every day in the year.

LEFT HAND
For Wire Diameter
3/16-3/8"



Sjogren TOOL & MACHINE CO., INC.
SINCE S&S 1927

WIRE PULLERS • WEDGE GRIPS • JAWS FOR ALL MAKES OF PULLERS AND TESTING MACHINES • CAGE ROLLERS • SWAGING HAMMERS • POINTING DIES • WIRE SPOOLERS

Used by Wire Men Who Want the Best!

14 SWORD ST. • AUBURN, MASS.

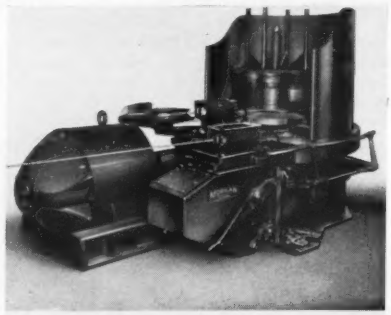
Copies of the catalog are available on letterhead request.

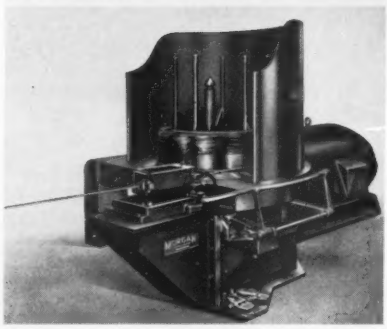
Morgan Completely Re-Designs Line of Vertical Wire Blocks

Incorporating every known design feature, construction advancement and operating convenience for drawing wire faster and at lowest cost per bundle, a completely re-engineered line of vertical wire blocks is announced by **Morgan Construction Co.**, pioneer wire machinery manufacturer of Worcester, Mass. Named "Mordraw" because of its notably stepped up productive capacity, this new line has been under development in Morgan research laboratories for more than a year. Many months before the first prototype was built and tested Morgan engineers conducted extended studies of every phase of wire drawing operations to determine areas in which departure from conventional design concepts could produce maximum operating efficiency.

* * *

Produced in both single and double deck arrangements, the new Mordraw machines are offered in three basic models, spanning a range of block sizes from 16 through 42 inches. Ample power is assured by motor ratings up to 250 hp, maximum, and drives can be arranged for either the die side or right-hand side of any machine.





* * *

Outstanding new feature of Mordraw blocks is their remarkably low draft line—32 inches on a majority of models, 34 inches on largest block produced. This eliminates effectively all problems and expense attendant with construction of special platforms or pits at the installation site. Even more beneficial, this development substantially reduces fatigue and improves working ease for the wire drawer. Other benefits provided by the new design include ability to handle heavy bundles and an exceptionally high cooling rate. Optional air only or air-and-water systems attain new levels of cooling efficiency—taking heat out fast before wire is affected, making it practicable to run out really heavy bundles, safely and speedily.

* * *

The new Mordraw vertical blocks

DTR Diamond Service

SPECIALISTS IN INDUSTRIAL DIAMOND PRODUCTS

DEPENDABLE Finest laboratory facilities • Over twenty years of diamond powder manufacturing experience • Accurate reproduction of sizing.

QUALITY

PRESSURE-TESTED

diamond powder photomicrograph

PRESSURE-TESTED grits and micron sized powders are the soundest and most efficient abrasives ever made.

PRESSURE-TESTED is an exclusive development of D.T.R. Co. Inc.

ECONOMY Strongly competitive prices to maintain our position as one of the world's leading manufacturers of quality grits and micron sized diamond powders.

DIAMOND TOOL RESEARCH CO., INC.

380 Second Avenue, New York 10, N. Y. • GRamercy 5-3530

are foremost in a series of major wire machinery developments to be announced by Morgan in the near future. Other equipment produced by the Morgan Construction Company's Wire Machinery Division include world-famous Morgan-Connor, multiple block Wire Machines, Dead Blocks, Bull Blocks, as well as a complete range of auxiliary wire drawing equipment.

Union Carbide Announces New Ethylene Copolymer

A combination of properties never before found in a single product is provided by a unique ethylene copolymer now commercially available from **Union Carbide Plastics Company.**

* * *

Property highlights include excellent flexibility over a broad temperature range and high resistance to stress-cracking; the compound, which contains no plasticizer, is easily injection molded, blow molded, and extruded in conventional equipment.

* * *

Designated Bakelite DPDB-6169, the new compound, at room temperature, has the torsional stiffness of a 90A Durometer elastomeric vinyl. Compared at –25°C., however, it is nine times as flexible. The copolymer is four times as flexible as a conventional low-density polyethylene at room temperature; three times at –25°C.

* * *

In flex cracking tests at 0°C., a typical low-density polyethylene fails at 50,000 cycles, other conventional materials at less than 250,000, while the new material survives in excess of two million cycles. In stress-crack resistance, it is equivalent to vinyl and far superior to conventional polyethylene.

* * *

Because of the low density of the new copolymer, 0.93, it is competitive, at its current price of 32.5 cents per pound, with higher specific gravity, low pound-cost materials. For example, the copolymer would be directly competitive with a 1.35 density material selling for 22.5 cents per pound.

AIRtrol Bulletin Explains Versatile Automation System

The new Reeves AIRtrol Bulletin explains how drive speeds of machines and processes can be automatically controlled and regulated by simple pnuematic instrumentation.

* * *

Concise drawings and descriptions show how AIRtrol can be applied to control liquid level, line pressure, process temperature, constant flow, steam pressure and motor loading. Web processes such as dancer roll tension and center-wind tension may also be controlled with AIRtrol.

* * *

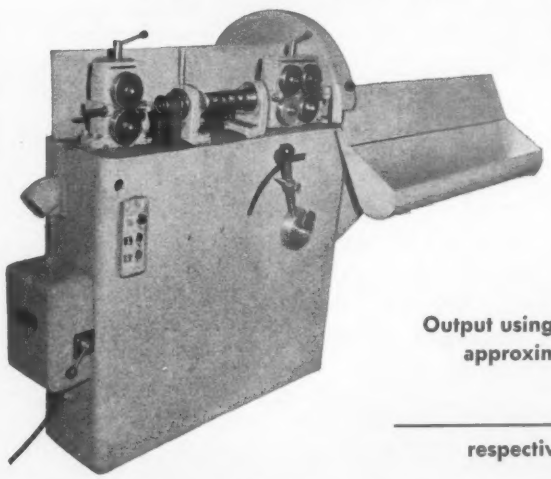
A number of pnuematic pressure control systems are possible including manual remote, automatic open loop, automatic closed loop, and multi-unit systems.

* * *

For your free copy of this 16 page AIRtrol Bulletin G-2500, write **Reliance Electric and Engineering Company,** Cleveland 17, Ohio.

HIGH DUTY AUTOMATIC FINE WIRE STRAIGHTENING & CUT-OFF MACHINE

with rotary arbor for pre-determined various lengths in one continuous operation at high production speeds with no distortion of the ends for fine sizes of round wire for coils in the range of sizes — .0197" through .0629" diam.



3 Speeds — 260'-330' and 400' P/M.

Range of Wire Lengths — 1.58" through 35'5"

Output using the lowest speed of 260' P/M the machine cuts:
approximately 42 lbs. of wire of .0315" diam. P/H.
66 lbs. of wire of .0393" diam. P/H.
128 lbs. of wire of .0551" diam. P/H.

respectively 24,000 pcs. of wire of 7.824" of length
32,000 pcs. of wire of 5.905" of length

PLEASE ASK FOR DETAILED QUOTATION FOR THIS NEWLY DEVELOPED AND PATENTED EQUIPMENT FROM

PAUL REICHER MACHINERY and EQUIPMENT, LTD.
600 EGLINTON AVE., EAST, SUITE 307 **TORONTO 12, ONT., CANADA**

Man-Made Diamond in Elgin Lapping Compound

The Metallurgical Products Department of the General Electric Company, Detroit, has announced that its Man-Made diamond is now being used in compound produced by the Abrasives Division of the **Elgin National Watch Company.** The Man-Made diamond is to be used in Elgin's Dymo-D compound, developed by Elgin specifically for the lapping of diamond dies.

* * *

Engineers from General Electric's diamond application laboratory in Detroit have cooperated with Elgin in the past several months during the evaluation of this material.

* * *

With this additional application, Man-Made diamond is now commercially available in grinding wheels, micronized powder, and compounds.

Noise—Subject of Symposium

Noise, one of the commonly-accepted but potentially dangerous concomitants of industry, will be discussed at the University of Wisconsin on May 18-19.

* * *

Once regarded as a simple annoyance, noise is now considered a potentially dangerous source of physical damage, explained **Richard McCormick,** coordinator of the program. He is an instructor in mechanical engineering extension.

* * *

Business, industry, science and government currently are involved in major research projects aimed at solving the problems of keeping noise down to levels that will not interfere with hearing, work, efficiency and ability to think, rest and maintain good health.

* * *

Focusing on industrial noise control, the sessions are being conducted by Engineering Institutes of UW Extension. Meetings will be at Wisconsin Center building on the UW campus.

* * *

Nine nationally-known authorities in the field of noise control will speak at the institute, which is expected to draw enrollees from companies in several states. The speakers are known for their research efforts and problem solutions, McCormick said.

Bulletin Features Hump Type Mesh Belt Furnaces

A newly published bulletin by **Harper Electric Furnace Corporation** features a re-designed line of 17 Hump Mesh Belt Furnaces for continuous brazing, annealing, hardening, and sintering.

* * *

Included are operating and construction details, optional equipment available, and dimensions for all electric and gas-fired models with heating chamber lengths between 3 and 11 ft.

* * *

Bulletin HMB-960 may be obtained by writing Harper Electric Furnace Corp., 110 Pearl St., Buffalo 2, N. Y.

ALUMINUM INGOT AND MILL PRODUCTS AND MAGNESIUM MILL PRODUCTS: JANUARY 1961

(Shipments and receipts are in thousands of pounds)

Item	Number of companies reporting shipments	January 1961			December 1960* net shipments	January 1960 net shipments
		Gross[1] shipments	Receipts[2]	Net[3] shipments		
ALUMINUM PIG AND INGOT, TOTAL	79	190,083	88,726	101,357	152,141	118,174
ALUMINUM MILL PRODUCTS, TOTAL	165	258,509	16,347	242,162	226,985	249,892
Sheet and plate, non-heat-treatable	28	104,707	12,891	91,816	81,519	96,029
Sheet and plate, heat-treatable	6	(D)	(D)	19,540	18,827	16,204
Foil, including foil in lamination	16	(D)	(D)	20,670	21,279	19,087
Rolled and continuous cast rod and bar[4]	7	9,446	2,238	7,208	8,802	9,740
Wire, bare, conductor and nonconductor	16	3,287	91	3,196	3,564	5,045
ACSR and aluminum cable, bare	11	16,134	60	16,074	13,955	13,351
Wire and cable, insulated or covered	14	4,709	...	4,709	5,179	4,543
Extruded shapes, alloys other than 2000 and 7000 series	103	61,329	797	60,532	57,816	64,949
Extruded shapes, alloys in 2000 and 7000 series	9	(D)	(D)	3,194	4,108	4,234
Drawn tube, alloys other than 2000 and 7000 series	10	5,323	...	5,323	4,083	6,425
Drawn tube, alloys in 2000 and 7000 series						
Welded tube, non-heat-treatable	7	[5]3,181	...	[5]3,181	1,606	2,333

*Revised.

D Withheld to avoid disclosing figures of individual companies. These figures are included, however, in the appropriate total.

[1]Gross shipments of mill products represent total shipments by producers to customers, including other producers, and shipments by producers to their own fabricating departments which manufacture products beyond the level of mill shapes. Ingot gross shipments include shipments by importers.

[2]For mill products, represents receipts from domestic producers only. In addition to receipts from domestic producers, 1,171,000 pounds of mill shapes were received through imports. For ingot, receipts from imports are included.

[3]For mill products, derived by subtracting the sum of producer's domestic receipts of each mill shape from the industry's gross shipments of that shape. Ingot data derived by subtracting all receipts from shipments reported.

[4]Includes a small amount of rolled structural shapes.

[5]Includes a small amount of welded tube, heat-treatable.

Cutting Production Costs With An MEK Load Control

The application of Load Controls, a device which continuously analyzes the usage of electrical power by a machine or process, is described in an easy to read booklet, "Cutting Production Costs with an MEK Load Control."

* * *

This new 32 page booklet will be of special interest to persons responsible for increasing productivity, protection of machines and tooling, automating equipment, or improving quality.

* * *

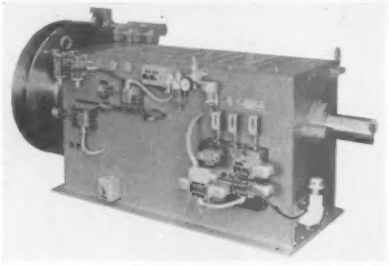
For anyone not familiar with the load control approach to problem solving, this booklet will be most interesting and useful. It describes the technique and advantages in a series of short, meaty descriptions, covering a wide range of applications.

* * *

For a copy, write to Machinery Electrification, Inc., 56 Hudson St., Northboro, Mass.

New Fenn Hydraulic Traversing Take-Up Reel

The Fenn Manufacturing Company, Newington, Conn., manufacturers of rolling mills and other precision metal forming machines and accessories, has developed a new Model 2310 Hydraulic Traversing Take-up Reel to yield an infinitely variable traverse lead, accommodating any wire within



its capacity. The reel can also be operated without the traversing feature for pancake winding of tape, ribbon, or strip.

* * *

The unit consists of a floor mounted, welded steel housing containing a spindle whose standard flange will mount a collapsible drum or standard industrial spool. Enclosed within the housing are the hydraulic pumps and their supply tank, while mounted externally for easy access are the hydraulic panel-mounted valves and all necessary electric controls.

* * *

Unique in this hydraulic system is the use of a supercharger pump which not only prevents leakage of air into the system but also maintains uniform operation over a much larger speed range.

* * *

Since all operating power, except for the supercharger pump, comes from the spindle, there remains only to apply a drive to it. This can be done with a belt or chain drive from existing equipment, with a clutch inserted between drive and spindle; with a separate A.C. motor and reducer. When the clutch is used, constant torque winding results; when a D.C. motor and regulator is used, constant tension winding results.

LOW COST precision wire plating

MAINTAIN UNIFORM COATINGS AT HIGH SPEEDS!

CONTINUOUS ELECTROPLATING EQUIPMENT

This low cost equipment performs with ease and efficiency that mean real savings. Preset quality control insures perfection without depending on operators' skill. No toxic fumes, clean operation at low temperature, elimination of work hardening during processing and many other features are the result of experience and sound engineering that go into the design of all Universal equipment.

We furnish complete installation . . .
For further information write to:

UNIVERSAL INDUSTRIAL EQUIPMENT CO.

SECAUCUS, NEW JERSEY SOLE AGENT IN CANADA: E. V. LARSON CO., LTD., TORONTO, CANADA

U. S. PATENT #2823180 AND FOREIGN PATENTS PENDING

Advantages of this type of take-up reel, according to the manufacturer, are: The ability to accommodate drums and spools of different widths and diameters; to traverse wind an infinite variety of widths within its capacity by simple hand-wheel adjustment; to operate over a wide range of line speeds; to traverse the spool rather than the wire; without also traversing the entire mechanism; to start from the same traverse position with every new spool. Also this take-up is claimed to be practically maintenance free.

* * *

Condensed specifications of the Model 2310 include: maximum coil weight 1,000 lbs., maximum stock tension 300 lbs., spindle diameter 3", maximum traverse stroke 10", maximum wire width (round and flat) 5/8".

* * *

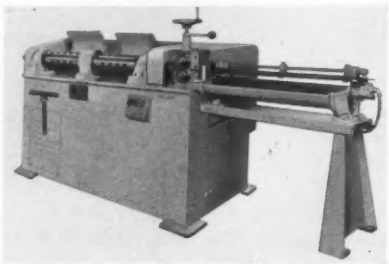
Other models are available with lesser and greater capacities. For complete details, write the company.

New Straightening and Cutting Machine Announced

The New Shuster Model 300V Variable Speed Twin Arbor Automatic "Torsion" Wire Straightening and Cutting Machine is announced by **Mettler Machine Tool, Inc.,** Boulevard Industrial Park, New Haven 4, Conn., for high speed production of high tensile wire from 19 gauge to 3/32" diameter, and up to 1/8" diameter soft basic wire.

* * *

These machines will produce torsion straightened lengths of alloy, high-carbon, stainless steel, and music wire at speeds up to 100% faster than previously possible.



* * *

Features include two counter rotating, 5 station, high speed straightening arbors, mounted on ball bearings. Reeves variable speed unit for infinite feed range to suit any application. Feed roll housing with shafts mounted on Timken bearings. Angled electric control panel for one position operation; new sensitive limit switch trips new improved target, with positive setting and positive release. Solenoid operated roll type clutch. Drive shaft mounted on ball bearings. Fly wheel on roller bearings. This new machine is arranged for high speed cutting — 12,000 cuts per hour — up to 8".

* * *

The New Shuster Model 200V, a smaller version of this new series, handles high tensile wire from .015" to 16 gauge. The machines are driven from a single motor for positive start and stop of arbors. Mettler, also, announces a companion line of Twin Arbor Torsion Straightening and Feeding Ma-

THOUSANDS OF CUTS THROUGH STEEL RODS WITHOUT A BREAKDOWN!

Typical of the reports that come from rod and wire mills everywhere. Proof-positive that Porter has practically eliminated down-time for repairs. To cut maintenance costs and speed your cutting operations, it will pay you to get all the facts on the Porter one-hose HYDRAULIC ROD and BAR CUTTERS.

CUTTER BLADES THAT ARE REALLY RUGGED

Blades are longer . . . have *more* bearing surfaces for rigid alignment. No side thrust to cause breakage. Filtered air taken into the cylinder is forced out around the movable blade on each cut — eliminates danger of dirt reaching bearing surfaces causing oil leakage and wear.

FOOL-PROOF HYDRAULIC SYSTEM

Just-one-hose design cuts replacement costs in half. Finger-tip control of cutting action! Reservoir-type 40 micron oil filter is easy to change. Adjustable relief valve saves wear and tear by providing the correct pressure for any cutting job. 12-Volt control circuit provides for operator safety.

PORTER

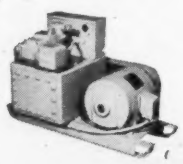
HKP®

ONE HOSE HYDRAULIC

ROD & BAR CUTTER

WRITE TODAY FOR ALL THE FACTS

Let us show you how any combination of 3 cutter-heads for capacities up to 1 3/8" steel rods and 5 hydraulic power units can be matched to your exact requirements. Or we can design special heads for punching, crimping, heading, or forming. Write today for an on-the-job demonstration or a copy of our Rod and Bar Cutter Catalog.



H. K. PORTER, INC.,

Somerville 43, Mass.

chines, without cutting mechanism, which have proven extremely profitable when used in conjunction with wire formers, coilers, etc., in production of critical wire forms and springs. Rejects are eliminated because parts can be produced from wire that is uniformly straight.

* * *

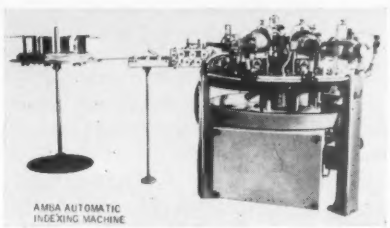
Mettler Machine Tool, Inc., also, manufactures 54 Models of Wire Straightening Components and Straightening and Cutting Machines from .015″ to 11/16″ capacities as well as 4 models of the Shuster 5/16″ cold thread rolling machine.

Amba Automatic Indexing Machine

Up to nine operations can be performed with a production rate of 2100 parts per hour (approximately) in a continuous uninterrupted flow of finished products.

* * *

Features: Each operation has its own motor, electric clutch and blower for cooling. Pipelines, cool-



AMBA AUTOMATIC INDEXING MACHINE

ing oil pump and oil collection container, etc. are incorporated in the machine.

* * *

Purpose: Production of small parts up to ⅜″ x 1½″ in ferrous or nonferrous metals.

* * *

The Amba Automatic is ideal for fast production of contact brushes, clips, plug pins and similar parts for the electrical industry. It is fully automatic, hopper, coil or bar feed as required.

* * *

Operations: Continuous wire straightening, cutting, drilling, tapping, milling, slotting, etc. All work heads (up to nine) perform sequence operations on the index table, from rounds, hexes, squares, etc. or profile material in coil or bar form.

For complete information write to **R. E. Demby, Imported Machinery Sales Co.,** Inc. P. O. Box 148, Berea, Ohio, exclusive sales agents for United States and Canada.

GE Opens 2nd Texas Sales Office for Silicones

General Electric's Silicone Products Department has established a second sales office in Texas, at 4219 Richmond Ave., Houston, and will be operated in conjunction with a warehouse at the same address.

* * *

The establishment of a Houston office became necessary to handle the continuing growth of sales in the Southwest, to accommodate the need for larger inventories of stock.

* * *

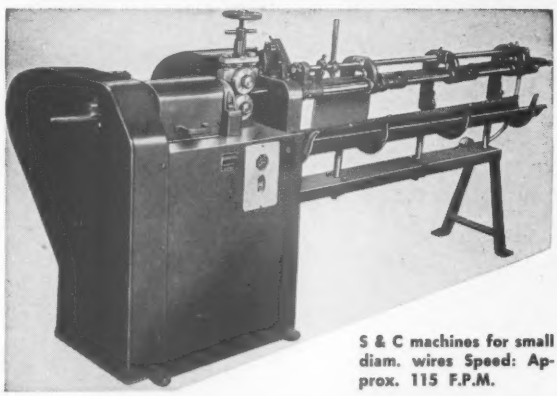
The Silicone Products Department's other Texas location is at 6500 Cedar Springs, Dallas.

New Liquid Vinyl for Conductors

Spectra-Strip Wire & Cable Corporation has announced an interesting new type of their Vyna-

New! Improved! Fast!

WELLS STRAIGHTENER & CUTTER



S & C machines for small diam. wires Speed: Approx. 115 F.P.M.

This completely redesigned line combines maximum efficiency with that rugged dependability, for which WELLS S&C machines have become justly famous.

Built in several sizes to handle 2 to 18 ga. basic and high carbon wire.

FEATURES

The guide bar of these new machines can be supplied for any cut lengths • The rotary flier runs on ball bearings for smoothness and long life • Cut-off is actuated by a solenoid for extreme accuracy of cut lengths • A two point cam construction provides a quick and positive return of the cut-off knife, eliminating the need for a clutch and dog • A counter is standard equipment.

A COMPLETE RANGE OF S & C MACHINES IS MADE BY WELLS FOR ALL SIZES OF WIRE. SEND FOR CATALOG ON THE COMPLETE LINE.

Frank L. Wells Company

Builders of Fine Wire Working Machinery

5821 FIFTH AVENUE • KENOSHA, WISCONSIN

Kote liquid vinyl, the vinyl insulation in a bottle that is finding so many uses in the electronics and electrical industries.

* * *

This material is called "Vyna-Shield", and behaves just as its name implies. It has the same instant adhesion to vinyl plastic that Vyna-Kote has, and like Vyna-Kote, it can be applied by dipping or brushing. The firm claims that Vyna-Shield will have many applications in the electrical and electronics field, wherever light weight, low cost shielding of vinyl wire is required.

For details write Spectra-Strip Wire & Cable Corporation, P. O. Box 415, Garden Grove, Calif.

Metallurgical and Petrographic Abrasives

Geoscience Instruments Corporation is pleased to announce an entirely new line of abrasive supplies for the metallographic and petrographic laboratory.

* * *

These coated abrasives, grains and flour are especially produced for fine laboratory work.

The Geoscience abrasive line is the most varied available. More grit sizes and styles are offered for use with standard laboratory grinding and polishing machines.

* * *

Geoscience is the first to offer the smaller, more economical 25 unit pack (standard size is 100 units).

* * *

For copy of catalog, write the company at 142 Maiden Lane, New York 38, N.Y.

New Catalog Available

A completely revised bound catalog describing a broad line of electrical enclosures is now available.

* * *

Complete construction details and specifications are included making this catalog especially useful for those who want detailed information at their fingertips.

* * *

While these enclosures are similar in appearance to others generally available, they offer many superior features at competitive prices.

* * *

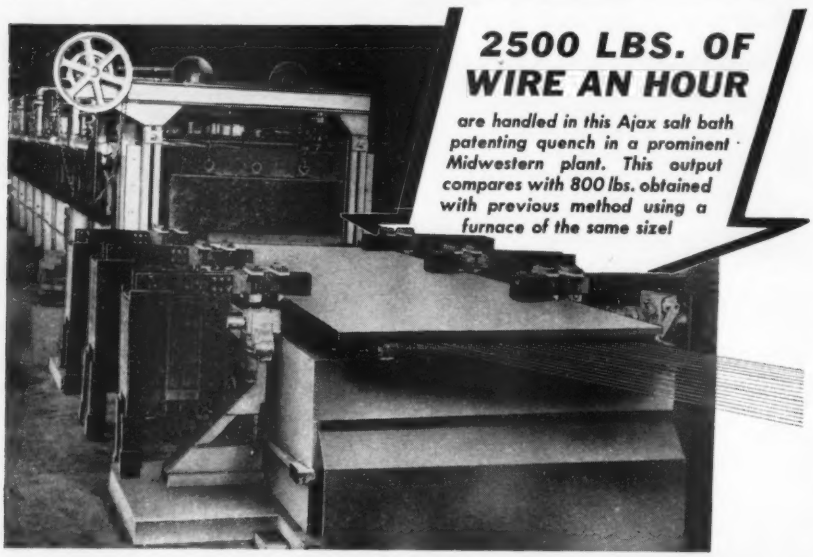
A large warehouse stock allows immediate shipment of all standard units. Modifications of standard units are made promptly. Special designs will be quoted upon receipt of details. Write, asking for "SF" catalog, to **Machinery Electrification, Inc.,** 56 Hudson St., Northboro, Mass.

Improved Quality for Natural Diamond Grit

The development of a new type of natural diamond grit has been announced by **Diamond Tool Research Co.,** Wholesale Division. Full scale production of these grits, known as "Pressure-Tested" Diamond Grits and Micron Sized Powders is now underway, with sales of these grits to manufacturers of Industrial Diamond Products having reached over a million carats.

* * *

This new diamond abrasive is unlike others in that the diamonds have been quality pre-tested in the method of production. Extreme pressures that are under precise


2500 LBS. OF WIRE AN HOUR
are handled in this Ajax salt bath patenting quench in a prominent Midwestern plant. This output compares with 800 lbs. obtained with previous method using a furnace of the same size!

Here's maximum speed, accuracy and economy in Wire Patenting!

No other method offers so many possibilities for quality improvement and cost reduction in the patenting of high- and medium-carbon steel wire or rods. Automatic temperature control—an inherent result of Ajax internally-heated salt bath furnace design—provides continuous accuracy within ±5° F. throughout the bath. You are thus assured of the uniformity so vital to obtaining proper tensile strength and grain structure.

More poundage can be handled. Savings up to 30% in pickling time are common. Salt residue is easily removed by a water wash. The entire patenting process lends itself readily to inexpensive automation. Maintenance is negligible. Long-life, immersed-type electrodes can be changed in an hour or two—without tearing down furnace or pot. Pots last indefinitely.

AJAX
HULTGREN
SALT BATH FURNACES
Internally heated electric and gas-fired types

WRITE FOR AJAX CASE HISTORY BULLETINS ON: ☐ Patenting; ☐ Process Annealing; ☐ Descaling; ☐ Cleaning, Preheating, Fluxing.

AJAX ELECTRIC COMPANY 928 Frankford Ave., Philadelphia 23, Pa.

control break the rough diamonds into sound, blocky grits. Flats and pieces with severe internal stresses are subjected to pressures that break them again and again until only sturdy grains result. Only those grits and powders that survive the pressure test are trade marked "Pressure-Tested."

* * *

Extensive tests have been made in lapping and grinding carbides, steel, corundum and diamonds with superior results. These diamond structures are extremely blocky, longer lasting, smoother cutting; and because of their uniformity, closer grading is possible.

* * *

Since the advent of General Electric's achievement in producing synthetic diamonds the pace of research and development has quickened. Many consider the new Pressure-Tested grits and Micron Sized Powders the most important development in natural diamonds. For additional details, write Diamond Tool Research Co., 580 Fifth Ave., New York 36, N.Y.

New Water Soluble Moly Lubricant

A new four page, illustrated report on the newly developed Bemol #110 Suspension, a water soluble molybdenum disulfide compound is available.

* * *

Covered in this report are product specifications, uses, relationship between die life and dilution ratios, and application methods. The Bemol #110 Suspension can be added directly to soluble fluids or can be diluted with water to form a drying lubricant pretreatment coating. Included are case history reports on wire drawing, heading, tube forming, deep drawing, die casting, extrusion, drilling, and pretreating. The wire industry, the first major user of the product, has reported die life increases ranging from 35% to well over 1,000% at concentrations well below 0.5%. Other advantages of the #110 Suspension are increased production rates, power consumption decreases, and improved surface finishes.

* * *

The #110 Suspension is noncorrosive to all metals, plastics, and rubber. It is non-flammable, non-gumming, non-foaming, and non-toxic. It can be used without decomposition to 750°F., and to 1,600°F. for short periods in such operations as extrusion, forging, and molding. Tests have shown that the #110 Suspension resists wear at pressures up to and beyond 400,000 psi.

* * *

Copies of the report are available from **Bemol, Inc.,** 131 State St., Boston 9, Mass.

Riverside-Alloy Relocates Detroit Office

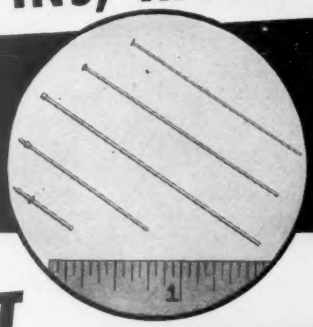
Relocation of the Detroit sales office was announced by **Riverside-Alloy Metal Division,** H. K. Porter Company, Inc., Riverside, N. J. The move was to larger and more adequate quarters.

* * *

The new Detroit location is 50 West McNichols Road, Detroit 3, and the telephone number is TUlsa 3-4600. **Joseph Rey,** a native of Detroit, who joined Riverside-Alloy in 1959, heads the sales office.

LONG, THIN PINS, RIVETS

COLD HEADED



FAST ACCURATELY

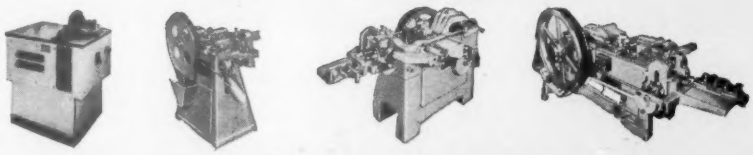
MORRIS-OMEGA

Special Model "O"

OPEN DIE Double Stroke Header, produces long thin parts in diameters from .020" to .090" up to 2⅜" long at rates up to 100 per minute!

Also available: Solid Die Headers for wire diameters as small as .012".

Write for literature.



For complete details and prices, write:

REM SALES INCORPORATED

SUBSIDIARY OF THE ROBERT E. MORRIS COMPANY

5018 FARMINGTON AVENUE • WEST HARTFORD 7, CONN.

Catalog on Twisting and Cabling Machines

The Edmands Company, 860 Wellington St., Cranston 10, R. I., has issued a catalog containing data sheets on each of the company's products.

* * *

This includes twinning, quadding, closing, cabling, service entrance, taping and take-up machines, each in various combinations designed to meet all production requirements.

* * *

The catalog is available to interested persons upon request to The Edmands Company.

New Exposure Program For Coated Wire

An atmospheric corrosion research program covering 65 types of aluminum and zinc-coated wire and wire products has been approved by ASTM Committee A-5 on Corrosion of Iron and Steel. Specimens will be exposed at seven sites in the summer of 1961.

Two new specifications have been prepared for presentation to the Society, for zinc-coated flat steel armor tape, and for copper-covered steel wire strand. A tolerance limit for the size of mesh in chain length fencing (A 392) is being considered.

* * *

A report covering the 1960 inspections of aluminum- and zinc-coated hardware exposed in 1958 has been completed and will be published with the 1961 Annual Report of the committee.

Dodge Adds Larger Size To Torque-Arm Reducer Line

Latest addition to the extensive line of Torque-Arm Speed Reducers by **Dodge Manufacturing Corporation,** Mishawaka, Ind., is a Size 17 single reduction unit with 5:1 gear ratio capable of transmitting 50 per cent more horsepower at output speeds up to 400 rpm.

* * *

The new shaft-mounted reducer develops greater torque than any other single reduction unit in the line, and can accommodate 60-hp motors in the top range of output speeds based on Class 1 AGMA ratings. This new reducer may be applied to equipment operating in the speed range above that of Dodge 15:1 and 25:1 double reduction reducers and in the horsepower range exceeding that of the No. 16 reducer, which is designed to accommodate motors up to 40 hp.

* * *

The No. 17 is available from stock for horizontal shafts but may be obtained on special order for vertical or inclined shafts. Bulletin 600 contains photograph, dimensional drawings, weights, prices, horsepower data and table of recommended V-belt drives.

Vital Ball Data in New SKF Booklet

The step-by-step story describing how Atlas balls are manufactured to achieve highest quality is told in a four-page section of de-

COPPER - Consumption of refined copper in the United States, in 1960 and January 1961, in short tons

	Wire mills 1/	Brass mills 2/	Chemical plants	Secondary copper smelters	Foundries and miscellaneous	Total
January-December:						
Cathodes	3,930	74,847	(3)	814	(3)	79,591
Wire bars	808,864	48,823	(3)	-----	(3)	857,687
Ingots and ingot bars	13,450	80,363	(3)	1,714	(3)	95,527
Cakes and slabs	-----	138,161	(3)	16	(3)	138,177
Billets	-----	144,795	(3)	-----	(3)	144,795
Other	875	------	(3)	180	(3)	1,055
Total	827,119	486,989	(4)	2,724	(4)	4/1,340,832
January:						
Cathodes	430	6,132	(3)	70	(3)	6,632
Wire bars	58,961	3,796	(3)	-----	(3)	62,757
Ingots and ingot bars	996	5,909	(3)	114	(3)	7,019
Cakes and slabs	-----	8,817	(3)	2	(3)	8,819
Billets	-----	11,001	(3)	-----	(3)	11,001
Other	53	-----	(3)	20	(3)	73
Total	60,440	35,655	(4)	206	(4)	4/98,301

1/ Includes all wire mills with rod-rolling facilities. 2/ Includes all brass mills using copper in refinery shapes; some have rod-rolling facilities. 3/ Not available.
4/ Consumption by chemical plants, foundries, and miscellaneous plants not included. Estimate of 24,000 tons included in total for 1960, and 2,000 tons for January 1961.

tailed sketches in a new publication by **SKF Industries, Inc.**, Front St. and Erie Ave., Philadelphia 32, Pa.

* * *

Ball grade conversion tables compare old and new Anti-Friction Bearing Manufacturers' Association standards. Other sections describe Atlas balls from 1/32″ to 2-5/8″ diameter made of chrome alloy steel; type 440 stainless steel; type 329 stainless steel; brass; aluminum bronze, and silicon molybdenum steel.

* * *

Each section is composed of engineering data on material, hardness, grades, tolerances, corrosion resistance, uses, magnetic properties, and general information.

Awards for Hot Dip Galvanizing Ideas

The American Hot Dip Galvanizers Association, with the cooperation of the **American Zinc Institute,** has announced that ten awards of $1000 each will be offered for ideas developing new applications and markets for hot dip galvanizing. Each award will be accompanied by an appropriate medal and a certificate of achievement.

* * *

The awards will be presented for ideas pertaining to (a) application of Hot Dip Galvanizing to a **new or unusual field** in which it has not been utilized before; or (b) an **improvement** in application in the fields where Hot Dip Galvanizing is now being used; or (c) new methods of after-treatment of Hot Dip Galvanized products.

* * *

Entries must be submitted prior to May 1, 1962 to the American Hot Dip Galvanizers Association, Manning Place, N.W., Washington 16, D. C.

New Hydraulic Tube Pointer

Manco Mfg. Co. of Bradley, Illinois, has introduced a new hydraulic Guillotine Tube Pointer for non-ferrous pointing. Model MTP-2500 reduces the outside diameter of the tube 30% in two seconds. In addition to its speed, the new unit is compact in size and offers the advantage of relatively quiet hydraulic action.

* * *

The new Tube Pointer can be used on tube diameters ranging from ½ inch to 2¼ inches without changing pointed segments; only the radius segments are changed, with average time required being two minutes, according to the manufacturer. The Model MTP-2500 is designed for heavy duty use with minimum maintenance. Weight of the unit is 600 lbs. Two links couple the die holder to the outer housing to guide both the segments and the die segment holder; this reduces downtime and twisting on off-center loads. A larger size tube pointer, similar to Model MTP-2500 is available for tube sizes up to 6 inches outside diameter.

* * *

For complete information, write: Manco Mfg. Co., Bradley, Illinois.

The 1961 BUYERS' GUIDE
Have you ordered your copy?
Price: $5.00

Some Recent Studies of Electrical Grade Fillers in Butyl Rubber and Other Insulating Materials

(*Continued from page 589*)

trical failure using platy talc suggests the possible use of economical thinner walled insulation. High tensile strength in butyl, coupled with other good electrical properties and improved water stability as compared to the other types of talc fillers, provide all-round attractive properties necessary for broader application.

* * *

Resistance to flow of uncured butyl insulation containing platy talc is better than with other electrical grade fillers. Chemical promotion with Elastopar will further improve uncured properties. Compression set properties of cured butyl-platy talc compositions are not as good as butyl insulation containing calcined clay.

* * *

Inclusion of platy talc in crystalline plastics having inherently higher dielectric strength than rubber slightly improves resistance to electrical failure. Other fillers like nonplaty talc, calcined clay and Whiting decrease dielectric strength.

Acknowledgement

The author is indebted to coworkers **W. C. Smith,** for guidance,

COMPOUNDING MATERIALS USED

Accelerators	Abbreviation	Company
Zinc Dibenzyl Dithiocarbamate	ZDBDC	Naugatuck Chem. Co., Connecticut (Arazate)
Zinc Dibutyl Dithiocarbamate	ZDBuDC	R. T. Vanderbilt Co., New York (Butyl Zimate and Tellurac)
Tellurium Diethyl Dithiocarbamate	TDEDC	
Benzo Thiazyl Disulfide	MBTS	
N-nitroso, N-methyl p-nitroso Aniline	——	Monsanto Chem. Co., Ohio (Elastopar)
Dibenzoyl-p-quinone Dioxime	DB-GMF	Naugatuck Chem. Co., Connecticut (Di Benzo-GMF and GMF)
P-quinone dioxime	GMF	
Wax and Antiozidant		
Sunolite 127 Wax	——	Witco Chemical Co., New York
Dioctyl p-phenylene Diamine	——	Universal Oil Products Co., Illinois (U.O.P. -88)
Fillers		
Calcined Kaolin Clay	——	Burgess Pigment Co. (Burgess Iceberg) Southern Clays Inc., New York (Whitetex)
Calcium Carbonate	Whiting	Thompson, Weinman & Co., New York (Atomite)
Talc	——	Sierra Talc and Clay Co., California (Mistron Vapor) Eastern Magnesia Talc Co., Vermont (Emtal) Desert Minerals Inc., California (Dessertalc) International Talc Co., New York (Asbestine and Nytal)

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STRANDER

MODEL 7 B 55

This precision, perfectly balanced machine features: rigid steel box structure-barrels of high strength ALCOA alloy — motor mounted below center of gravity — safe, positive drive — push button controls— carbide wire guides — interchangeable cradle assemblies — standard cradles taking 7" diam. X 4" Traverse Spools — 30 lengths of lay.

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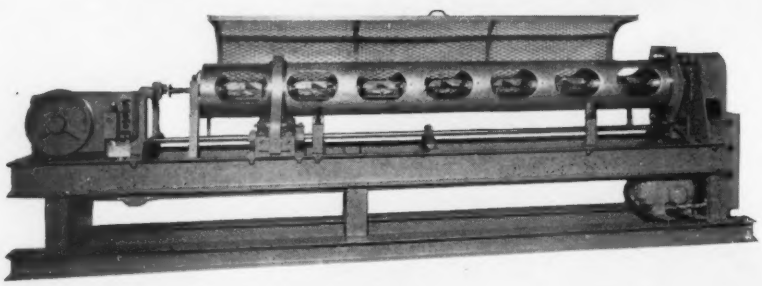

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WE ALSO DESIGN AND BUILD SPECIAL EQUIPMENT TO MEET SPECIFIED REQUIREMENTS

and **J. Murphy**, whose dependable laboratory work contributed materially to this paper.

BIBLIOGRAPHY

1. Smith, W. C., Rubber World, 129, 55 (1953)
2. Smith, W. C., "Butyl Insulation," Paper presented at Signal Corps Symposium on Communications Wire and Cable, 1954
3. Whitehead, S., Dielectric Breakdown of Solids London: Oxford 1951, p 109
4. Rosch, S. J., AIEE Transactions Paper 55-678
5. Carroll, J. C., AIEE Transactions Paper 55-668 Lee, A. R. McKinley, R. B.
6. Couch, W. H., AIEE Transactions Paper 55-693 Hunt, G. H. Kennedy, N. D. Ware, D. H.
7. Whitehead, loc. cit. 35-37
8. Ibid, 39 and 75
9. Ibid 115
10. Ibid 125
11. Mason, J. H., "Electrical Insulation Dielectric Breakdown" London: Proc. I.E.E.

New Reeves Motordrive Catalog

Catalog G-100, a new 88-page publication covering the complete line of Reeves Vari-Speed Motordrives, ¼ through 40 hp., is available.

* * *

Data in the catalog includes full rating tables, with new additional output speeds. Dimension diagrams and charts for over 100 different assemblies, new higher overhung load and new controls, are also contained in this new catalog.

* * *

A Reeves Vari-Speed Motordrive is a self-contained variable speed drive unit. It includes an a-c. motor, variable pitch pulleys, and a gear reduction unit, when specified, in a single compact housing.

* * *

The new G-100 Catalog, which gives a complete description of all Reeves Motordrives, is available from **Reliance Electric and Engineering Co.**, 24701 Euclid Ave., Cleveland 17, Ohio.

Bowman Acquires Pyramid Nut & Bolt

The Bowman Products Co. has announced the acquisition of **Pyramid Nut & Bolt Corporation** of Newark, N. J. The latter company is active in the special fastener field, catering to the needs of industrial and electronic concerns in the Metropolitan New York-Northern New Jersey area. It will be operated as a wholly-owned subsidiary of Bowman under the direct guidance of the present Pyramid management, which has broad experience in the special fastener field.

* * *

This is the first step in Bowman's expansion plans in the fastener specialist field and will provide an additional means of distribution for Bowman's broad fastener line including DuPont industrial expansion rivets for which Bowman Products Co. is the exclusive international distributor.

With **COOK'S** *improved, high speed*
HOT-DIP TANK-TINNER

you can enjoy production up to
20,000 FEET A MINUTE!*

Yes, here is America's most advanced-design tinning installation. Fully complete because it includes a supply stand, flux pot with dip rods and wipes, tinning tank with burner and automatic temperature control units, water cooling tank with recirculating pump and high-speed take-up that maintains constant linear speed. Remember, every part of this machine can be built to suit your own particular individual needs.

* Using 20 lines of fine wire

Check these FEATURES

- Very flexible in its design
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It is equipped with shaftless, fast loading cradles, with means for locking reels in place and eliminating side slap.

Operating speeds from 70 to 105 R.P.M. Power can be supplied either by an induction motor, Warner clutch, and Vee belt drive, or a wound rotor motor, resistors, and Vee belt drive.

This Machine accommodates reels 10 Inches Diameter, 10 Inches Overall Width.

Filling Head for 18 packages, 8 inches diameter—8 inches traverse, equipped with adjustable friction devices.

Binding Head accommodates six yarn packages 6 inches diameter, 4 inch traverse and is driven through a clutch, counter shaft and variable speed device.

The Eccentric Taping Head accommodates 4 pads 18 inches in diameter, 2 inches in width, and is driven through a clutch, counter shaft, and variable speed device. Tape pads equipped with constant tension devices.

Capstans are dual 4 groove 30 inches diameter, driven through change gears.

This Planetary Cabling Machine is one of a number which we have built handling reels 8, 10, 12, 16, 19, 24, or 30 inches in diameter. We can supply Standard units to meet practically all requirements.

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A Brief Survey of Wire Rod Defects—Their Occurrence and Detection

(*Continued from page* 596)

across each side where the fin has been worked excessively in the first drawing pass and eventually commenced to tear.

* * *

Deep etch tests on samples cut from the defective wire will quickly reveal the presence of any serious faults persisting from the rod stage.

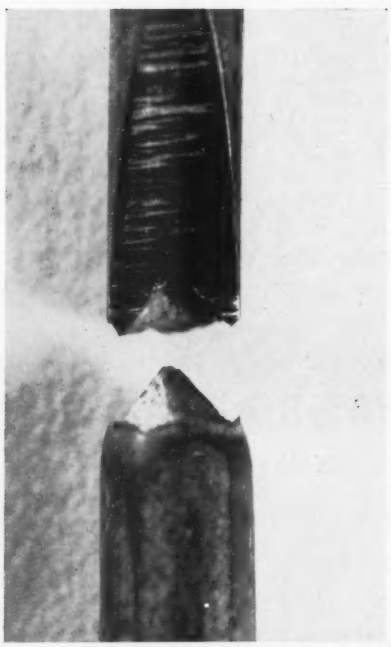

Fig. 8 — Photograph at 4x magnification of a cup and cone fracture which occurred in the first pass in drawing from 5g material. The cup side of the fracture (the drawn wire) has been ground down to the centre to show the shape of the cup. * * * * * *

Conclusion

Any Wire Manufacturer is prepared to stand by his product, sure in the knowledge that he has sent to the Customer the most suitable wire for his needs, produced by the best techniques available. He must, however, have the assurance of the rod suppliers that they in their turn are always making maximum efforts to produce the consistently sound and well rolled steel rods required by the modern Wire Industry.

* * *

It is often found that certain mills can maintain an extremely

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high standard of good clean steel well cast and free from segregation, others can produce exceptionally smooth surfaced rods on high speed merchant rod mills. The Wire Manufacturer would naturally like to see the high standards, which are known to be possible, achieved consistently by all suppliers.

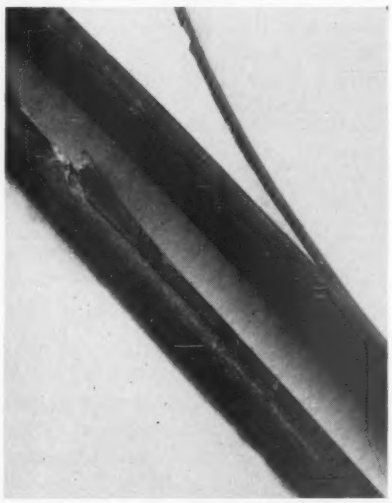

Fig. 9 — Photograph at 4x magnification of two samples of 11g wire with surface laps breaking away. On one sample a long sliver of material is curling away. The other sample has just commenced to tear and the surface crack can be traced along the wire. * *

* * *

It is a responsibility of the wire rod user to be able to present the clearest possible picture of rod performance to the manufacturer, so that any necessary controls or improvements can be put in hand to remedy apparent faults. The rod used is also in an ideal position to be able to note and report favourably on any improvement in rod quality.

* * *

Finally may it be said that it is the writer's belief that the Steel Makers and Rod Rollers can produce the high quality of wire rods which will be needed in even greater quantities in the future and that we should be able to look forward to the time, not too far distant we hope, when any rod inspection staff is merely confirming that at least 90% of incoming rods are of quality suitable for

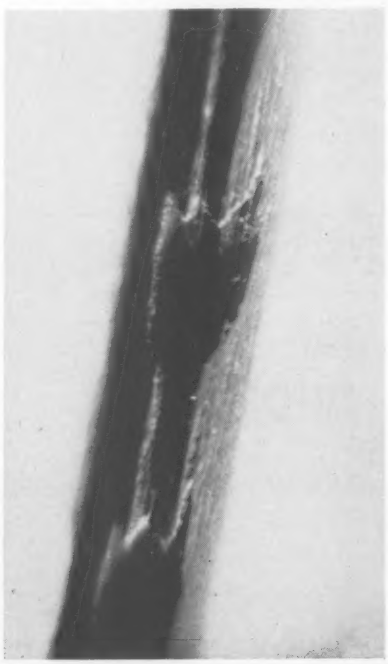

Fig. 10 — Photograph at 10x magnification of a sample of .068" wire, which broke in drawing, deep etched to reveal a surface fault. The V notches can be seen and are shown to be associated with a deep surface crack. * *

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drawing to 4 or 5 thousandths of an inch diameter at speeds of 4,000 feet per minute.

Parallel Paths of Progress for Aluminum and Electrical Industries

(*Continued from page* 599)

in the forefront in the "race for Space". While conductivity, strength, nonmagnetic character and resistance to corrosion are valuable in terrestrial electrical applications, the prime requisite for space and missile activities is light weight. Aluminum has been indispensable in the conductors and connectors which have gone into orbit with our latest satellites.

* * *

The electrical industry has a history of vigorous growth. Our consumption of electricity in all its forms has doubled every ten years, and there are no signs of this trend slowing down. It seems certain, as aluminum enters its 75th anniversary year, that the aluminum industry will contribute to and benefit by this expanded use of electric power.

New Bulletins on Insulating Materials

Two product bulletins, "Power Cable Insulated with 'Alathon' Polyethylene Resin Selected for San Francisco Bay Bridge Reconstruction," and "New IBM Computer Uses Air Spaced Ribbon Cable Insulated with 'Rulan' Flame Retardant Plastic," have recently been issued by the **Polychemicals Department** of the Du Pont Company.

* * *

The first tells how the electrical properties of "Alathon" were used in the rewiring of the Golden Gate Bridge lighting system and the second, why "Rulan" was chosen for the new IBM's 7090 Data Processing System.

* * *

Requests may be sent directly to **R. C. Botsch**, Advertising Department, **E. I. du Pont de Nemours & Co.**, Wilmington 98, Del.

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Simultaneous Extrusion of Polyethylene and Polyvinyl Chloride Coatings on Electrical Conductors

(*Continued from page* 604)

used before introduction of the multicoat extrusion facilities. We are currently insulating and jacketing the conductor at a speed of 1500 FPM. Actually, the facilities shown are capable of performing at speeds in excess of 2000 FPM after means are installed for more complete cooling of the two plastic coatings.

* * *

The facilities described in this paper can be used for the same plastic in two different colors. They can, as has been pointed out, be used where two entirely different plastic materials are employed, such as polyethylene and PVC. Two or more conductors can, of course, be coated simultaneously, if the need arises. Moreover, either extruder can be operated entirely as a separate unit by simply inserting the proper tool assembly. The space occupied by the multicoat extrusion facilities, in terms of product turned out, is only about half of what would be required if two separate operations are employed. The saving in investment costs, on the same basis, would be about 40% of the cost of conventional equipment. Substantial operating economies over conventional equipment will result through reduced scrap, maintainence and the more efficient utilization of labor.

Automatic Drive Control Used in a Swiss Continuous Merchant and Rod Mill

(*Continued from page* 607)

cutting and cropping, the magnetic clutch is switched in without any time-lag by the same time relay, aided by an electronic contactor (thyratron). The thyratron merely initiates the switching operation and is immediately shunted out by a contactor which then carries the full currrent, thus allowing this method of switching to be also used for high currents. The need for an electronic contactor is explained by the simple fact that at a rolling

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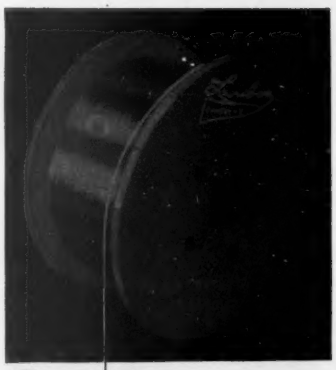

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Four-Slide, #324 Baird, 24" Feed, 1948	
Four-Slide, No. S-3-F Nilson, Inc. press, Excellent	684-36
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Spring Coiler, W-21 Torrington, New '57, .015—.072"	684-10
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Spring Coiler, W-21 Torrington Clutch Type, Ser. 35920	684-17
Spring Coiler, W-3001 Torrington Torsion, New	684-12
Wire Straightener & Cutoff, Lewis #1C, 1/16—1/18", 8' length	684-25
Wire Straightener, 1/4" ADT, 5 HP	684-32
Wire Straightener & Cutoff, Lewis #2C, 1/4" x 6', Excellent	684-19
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Wire Straightener & Cutoff, 10' 5/16"	684-21
Wire Flattening Mill, 4" x 2", 10 stand tandem, Waterbury Farrel	684-11
Wire Drawing Mill, Vaughn #4-5 HIV Motor block, #5 rod cap., 7/32"	684-13
Descaler, Mechanica, .031-.375 gauge rod, New '56, Excellent	684-14
Wire Pointer, 1¼" to 6" capacity, Budgens Auto., New '59, .020 to .051	684-03
Chain link fence weaving machine, Blashill, New '54, Exc..	684-22
Knitting Machines, Sinfra, for braiding cotton on wire	684-23
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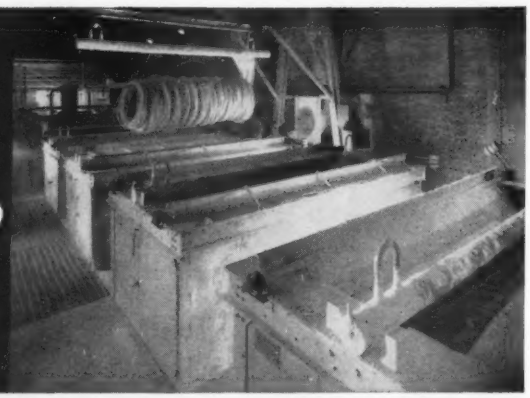

Faster baking, greater fuel economy, maximum production efficiency are just a few of the results of the exclusive heating arrangement of the Carl Mayer Hi-Speed Rod Baker. It also has a patented blow-off feature which removes moisture without damage to coils.

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speed of 10 m/s a discrepancy of only 1 ms results in a cutting error of approx. 10 mm. The crop shears are controlled and adjusted from the control pulpit shown in Fig. 3.

* * *

Acknowledgement is due for data and illustrations to Messrs. Gesellschaft der Ludw. von Roll'schen Eisenwerke, A.G., Gerlafingen, Switzerland. The electrical control equipment has been designed and supplied by Brown-Boveri A.G., Basle; the mechanical equipment was made by Schloemann A.G., Dusseldorf.

Get the habit of reading

regularly

WIRE AND WIRE PRODUCTS

The Wire Man's Magazine

New 7-Strand Wire Rope

Consumers of wire rope have had many variations or combinations or adaptations of wire rope in the past 60 years, but nothing invented so far compares with the new "7-FLEX", 7-strand wire rope, according to **Macwhyte Wire Rope Corp.**, the manufacturer.

* * *

This new rope is said to be practically a universal, all-purpose one. Patents have been applied for.

* * *

The basic difference between this and other ropes is that it is made of 7 strands plus an independent wire rope core instead of the conventional 6 strands or 8 strands in general use today.

* * *

This new "7-FLEX" wire rope combines the best features of 6-strand and 8-strand wire rope. It has an independent wire rope core. It was designed and is manufactured **only** by MacWhyte who have been wire rope manufacturing specialists for 60 years. Sizes manufactured are ½" to 1⅛", inclusive, ranging in strength from 13.1 tons to 64.2 tons.

* * *

The rope has been tested and proved in service to meet the needs of our modern high-output machines for a wire rope having the best combination of wearing qualities (abrasion resistance) and flexibility (bending fatigue resistance).

* * *

Bulletin 60100R, available free on request, describes and lists typical uses. Address Macwhyte Wire Rope Company, Public Relations Department, Kenosha, Wisc.

Revolutionary Heating System—Electrical Potential Applied to Reinforcing Fabric

(*Continued from page* 615)

was divided into five slabs, each approximately 17 x 40 feet in size. The odd numbered slabs were poured first, and after they took initial set, the forms were pulled, and the even numbered slabs butted up against them. Later, 1½ inch deep contraction joints were sawed between the slabs.

* * *

Six dry-type transformers will be used to power the radiant networks of welded wire fabric in the concrete slab. Two hundred and eight volts will be applied to the transformers, but the potential applied to the wire will be only 20 volts. The current flow in the fabric is calculated to be in the 500-600 ampere range, with 45 to 55 amperes in each of the 11 longitudinal wires in each strip of fabric. (Tests made previously show that in a length of wire fabric, 95 percent of the current will be in the longitudinal wires, with relatively little in the transverse wires, since electricity always seeks the shortest path to complete a circuit.)

* * *

Despite the low 20 volt potential involved, the Northern States Power engineers have taken care that the current be confined to the fabric network by specifying insulation of any obstructions in the slab, or, alternately, removal or detour of any wire that closely ap-

proaches any obstruction such as drains, conduits, plumbing, etc.

* * *

The calculated currents in the welded wire fabric are designed to emit 20 watts per square foot in the warehouse area, or a resultant floor surface temperature of 80 degrees, and 15 watts per square foot in the office-shop area, with a slightly lower floor temperature (because of the auxiliary baseboard heating). Eighty-five degrees is considered the highest temperature which will not cause discomfort to the foot, but even 80° is considered ample, since the effect of radiant heating is to warm the object or the person, and not the air.

* * *

The insulating materials used in the walls and roof were styrofoam and rigid fibre board. Although the amount and kind of insulation used were standard for a building of this type, special care was taken in placement and installation. (The roof design is such that additional insulation may be added at a later date if desired.)

* * *

Temperatures in the Minot building will be controlled by a system of thermostats, four embedded in the floor slab itself, and others measuring the air temperature, both inside and outside. These stats will control the heating system, "predict" coming temperature changes and demands, and actually switch the transformers on and off. Because of the tremendous currents involved on the output, or fabric side of the transformers, the switching will be done on the 208 volt, or input side. Time clocks will be used in conjunction with the thermostats so that preset schedules can be arranged to take advantage of off-peak heat storage.

* * *

Engineers of the Northern States Power Company estimate that heating the new service facility in the Minot area will require about 300,000 kilowatt hours annually, or, at an estimated demand and energy rate of 1.5 cents per kwh, represent a heating bill of about $4500.00. For over 105,000 cubic feet of space, the monthly heating

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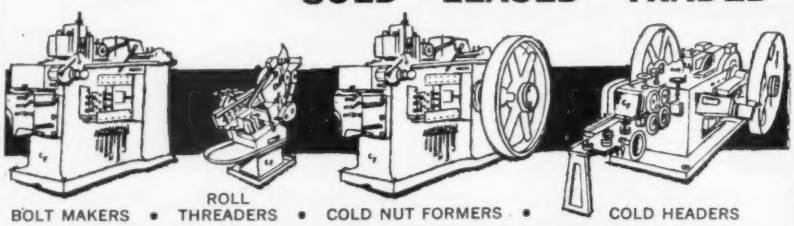

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average will probably be about $375.00.

* * *

Although the Minot installation incorporates the latest thinking in radiant heating, and in the "double" use of welded wire fabric, it is not the only such installation. Actually, first experimentation in electrically heating slabs using material other than especially manufactured wire, was done by Commonwealth Edison Company in Chicago, starting in 1945. Three installations were made between 1945 and 1957 in which the resistance material employed was expanded metal or diamond mesh. In 1957 the use of wire fabric was suggested because of the ease of unrolling and placing fabric, and because of the economy inherent in the "double" use of reinforcing fabric.

* * *

Accordingly, in the fall of 1957, Commonwealth Edison erected a service facility at DeKalb in which the resistance material was welded wire fabric. Because of the generally favorable results from this "in-service" test, engineers of the Chicago utility firm next decided to test wire fabric in the laboratory to determine the relationships of current flow, resistances, and wire sizes. From this research (and endorsing the practical results at DeKalb) it was discovered that as current increases in a magnetic material such as steel, the resistance due to "skin effect" decreases and therefor the effective resistance decreases.

* * *

Results of the Commonwealth Edison tests and experience were furnished the Northern States Power Company engineers, and inspired them to continue the experimentation. One of N.S.P.'s Industrial Sales Engineers, **France Anderson,** was an enthusiastic supporter of this application, in order to evaluate the potential of this type of heating. But **W. R. Williams,** Minot division manager, and his general superintendent, **Loren E. Linder,** were the moving spirits behind the Minot test installation. Engineer **Harold Teachout** of the

FUTURE MEETINGS Scheduled for THE WIRE ASSOCIATION

June 22-23, 1961

West Coast Regional Meeting of the Association at the Jack Tar Hotel, San Francisco, Cal. Plant inspection trip will be to Bethlehem Steel Company's South San Francisco Works.

October 23-26, 1961

Annual Convention of the Association at the French Lick-Sheraton Hotel, French Lick, Ind.

October 22-25, 1962

Annual Convention of the Association at the Lord Baltimore Hotel in Baltimore, Maryland. Plant visits to Bethlehem Steel Company's Rod & Wire Mills at Sparrows Point and to Western Electric Company's Point Breeze Works are scheduled.

Note these dates on your calendar for future reference.

THE WIRE ASSOCIATION

RICHARD E. BROWN
Executive Secretary

---

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NSP Minneapolis headquarters office was technical adviser in charge of design.

The Wonderful World of Wire Rope

(*Continued from page* 616)

(looping) it; he must be able to cut and splice ropes accurately and know just how much of a load he can put on a rope without stressing it to its breaking point. A new rope can easily be damaged by operating errors—so the "smart operator" breaks it in. Putting a new rope through a working cycle at slow speeds and light loads actually strengthens it — by setting the strands more firmly in place.

* * *

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* * *

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Wire Kinks

(*Continued from page* 611)

recorded, and the poundage per 1000 feet calculated.

* * *

For preliminary designing a formula has been devised that will provide the same information. It is:

$$\text{Tan } \theta = \frac{2P\pi(D+2T)}{C}$$

Where O is assumed to be 52°
P is picks per inch
D is diameter of wire
T is yarn thickness
C is number of carriers

The IDA Annual Meeting

One of the highlights of the 16th Annual Convention of the **Industrial Diamond Association of America, Inc.,** in Hollywood, Fla., was the Technical Session on March 15. This climaxed several days of Board, Committee and General Meetings which included election of Officers and Directors.

* * *

The following Officers were elected to serve for the coming year: As President, **Leopold H. Metzger,** Super-Cut, Inc., Chicago, Ill.; First Vice President, **Charles Baumgold,** Diamond Tool Research Co., Inc., New York City; Second Vice President, **Eric J. Schneider,** Engis Equipment Company, Chicago, Illinois.

* * *

As Directors for the coming two years, **Irving Freed,** Freed Industrial Diamond Corp., New York City; **Edward Katz,** The Diamond Drill Carbon Co., N.Y. City; and **Leonard A. Zucker,** Union Wire Die Corp., New York City. The out-going President, **Bernard Jolis,** U.S. Industrial Diamond Corp., will serve as Director for another year. Directors elected last year and remaining in term for one more year are: **Joseph Klipper,** Clipper Diamond Tool Co., Inc., New York City; **Frederick W. Lindblad,** U.S. Diamond Wheel Co., Aurora, Ill.; **Herman J. Meinert,** J. K. Smit & Sons, Inc., Murray Hill, N.J.; and **Charles B. Proudfoot,** Diamond

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* * *

The technical Session was attended by some sixty industrial diamond industry men, most of whom are Members of the Industrial Diamond Association. Three papers were read on various phases of industrial diamonds applications and evaluation.

* * *

The Officers' Reception and dinner was held March 13 and the I.D.A. Reception and Annual Banquet on March 15. Special awards were presented by the out-going President, **Bernard Jolis,** who in turn, was the recipient of an award presented by I.D.A.'s newly elected President **Leopold H. Metzger.** Also honored was one of I.D.A.'s Charter Members, **Doris Van Itallie,** The Van Itallie Corp., New York City. I.D.A.'s former and only other Executive Manager, now an Honorary Life Member, **Athos D. Leveridge,** received an appropriate scroll. Present Executive Manager, **Margaret J. McGinnis** was given an inscribed bracelet from the out-going President. The Convention had been arranged by Mrs. McGinnis.

* * *

Among the topics discussed and processed during the business sessions were: Commercial Standard CS123-49, Grading of Diamond Powder and B74 Abrasive, Standard Shapes and Sizes, Diamond Grinding Wheels, Hand Hones, Machine Hones, Mounted Wheels and the possible revision of Guide #1205 pertaining to Core Drill Material.

Bulletin on Fatigue-Proof Bars

La Salle Steel Company, Chicago, Illinois, has introduced the second in a series of case study portfolios on "Fatigue-Proof" Steel Bars.

* * *

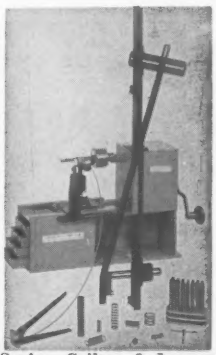
This portfolio deals with the effect of "Fatique-Proof" on end costs in typical parts applications. It reveals dollar-and-cents savings in individual studies on: (1) An adapter for a coil winding machine; (2) A diesel pump fitting; (3) A foundry flask guide pin; (4) An oil pump distributor shaft; (5) A power steering pedestal shaft; (6) A motorcycle axle shaft; (7) A generator armature shaft; (8) A transmission shifter post; (9) An outboard motor tilt pin; (10) A ball stud for a steering arm.

* * *

"Fatigue-Proof" Steel Bars are made by the patented Elevated Temperature Drawing process. Among the costs, delays and problems by-passed are heat treating, cleaning, straightening, finish grinding and inspection. The material's 140,000 psi minimum tensile offers high strength in combination with machinability rated at 80% of B1112.

* * *

This new La Salle portfolio should be of interest to production, design and plant maintenance engineers, or anyone involved in the selection and purchase of material



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New Bulletin on Diamond Abrasives

The Wholesale Division of **Diamond Tool Research Co., Inc.** is pleased to announce the publication of the seventh in its series of technical bulletins, entitled "Diamond Abrasives".

* * *

Bulletin #7, which is illustrated with comparative photomicrographs of the various diamond grits, carefully and completely reviews the latest advances and techniques in the uses of diamond abrasives. Comparisons are made between the Man-Made diamonds as produced by General Electric, the Selected Natural Diamonds of Industrial Distributors, Ltd., and the Pressure-Tested Natural Diamond grits as produced by Diamond Tool Research Co., Inc., 580 Fifth Ave., New York 36, N. Y., from whom Bulletin #7 may be secured.

Howe Sound Acquires Electric Wire Co.

Howe Sound Company has acquired the **Electric Wire Company, Inc.,** manufacturers of fine wire, according to an announcement made by **William M. Weaver, Jr.,** president.

* * *

Electric Wire Company's plant and office facilities are located in Northampton, Mass. The company is a producer of stainless steel, bronze, brass, silver and special alloy wire used in such end products as missiles, aircraft, electronic equipment, filters, springs, electric brushes and cable. Equipped with a modern plant, the company is able to manufacture a wide variety of highly specialized wires.

* * *

Mr. Weaver said the acquisition is a further step in the integration of Howe Sound product lines, enabling his firm to enter the specialty wire field. He stated that this field is a growing industry and that sales from the acquisition are expected to make an effective contribution to overall Howe Sound Co. volume in 1961. The company will operate under its present management as part of Howe Sound's Super Alloy Products Division.

NEMA to Hold Western Conference

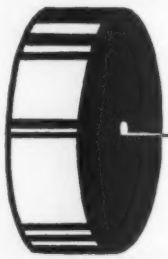
The National Electrical Manufacturers Association will hold its first Western Conference at The Biltmore Hotel, Los Angeles, Cal., on June 8 and 9, it is announced by **Joseph F. Miller,** NEMA Managing Director.

* * *

Arrangements will be under the direction of Co-Chairmen **A. Arval Morris** of Anaheim, Cal., President of Electra Motors, Inc., and **Raymond M. Waggoner** of Emeryville, Cal., Vice-President—West Coast, Hubbard and Company.

* * *

In addition to the 2-day main Conference, plans also are being made for several group meetings,



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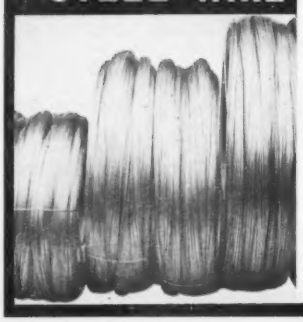
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including special sessions for manufacturers of electric house heating equipment, lighting equipment and appliances. These meetings are planned for June 7 and the morning of June 8.

Electroplating Definitions Ready for Publication

ASTM Committee B-8 on Electrodeposited Metallic Coatings and Related Finishes has prepared for publication a series of over 200 definitions relating to electroplating of metals. These are the first definitions that have been prepared by the committee covering terms used in Society standards and in the industry.

* * *

A specification for multi-layer (duplex) electrodeposited nickel coatings has been prepared to permit standardization of these coatings for use in outdoor surfaces. Two systems are being considered for designating chromium-nickel-copper decorative coatings that will permit labeling to ensure consumer quality. One of these methods will be presented to the Society for publication at the earliest possible time.

* * *

Interlaboratory work is continuing to find the best dye for checking the sealing of anodic coatings on aluminum alloys. A specification for anodic film thickness has been completed.

* * *

Interlaboratory data on the use of magnetic flux gages to measure electrodeposited film have been reported. These data will provide a basis for revising and enlarging existing thickness test methods in the near future.

* * *

The committee will sponsor a symposium on electroforming in the near future. Those interested in participating in it should get in touch with **Edward B. Saubestre,** technical director, **Enthone, Inc.,** Box 1900, New Haven 8, Conn.

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Sales Agent Named by Metal Carbides

Viking Tool and Steel Company, Inc., 1039 Niagara Street, Buffalo 13, N. Y., has been appointed by **Metal Carbides Corporation,** Youngstown, Ohio, as its sales agent in western New York State, handling the sales and service of its line of tungsten carbide tools, dies, blades, rolls, bushings, special metals, and diamond products marketed under the trade name of Talide.

New Cable Plant in California

A new 40,000-square foot plant is being established in Gardena, Cal., by the **William Brand-Rex Division** of American Enka Corp. to manufacture a broad range of military and commercial wires and cables.

* * *

Machinery and equipment for cabling and cold process jacketing presently housed in the existing Santa Monica plant will be transferred to Gardena where they will

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be integrated into the new production operations, according to **Maurice Winger, Jr.**, general manager. Mr. Winger said, that until this move, West Coast facilities for extruded cable jackets have been limited, virtually all of it having been done in the East. Operations at Gardena, expected to be started in late April, include the primary insulation of conductors, stripping, braiding and shielding.

* * *

Commercial Production of Re-Mo Alloy Announced by Chase

The first commercial production of Rhenium-Molybdenum alloys was announced recently by **Chase Brass & Copper Company.** This development will make available improved materials for use in many aero-space, electronic and electrical applications at a cost significantly below that of pure rhenium.

* * *

John H. Port, manager of the newly formed Chase Rhenium Division, called the development a major advance, making a high strength refractory alloy with good ductility available for specialized application. The alloys have advantages over both pure rhenium and pure molybdenum.

* * *

Rhenium products are used in the electronics and electrical fields as critical components in missile and space vehicles. Specific applications include: grids, heaters, and cathode supports for electronic tubes, thermocouples, and welding filler rod.

* * *

Chase was the first company to produce wrought rhenium. This was in January 1959. Rhenium is an extremely dense, silver colored metal with a very high melting point (5756 degrees F), a good combination of strength and ductility and excellent electrical characteristics even at elevated temperatures. Only one other metal, tungsten, has a higher melting point.

* * *

Molybdenum is a refractory metal with a melting point of approximately 2600 degrees C. It is one of the most widely used high temperature metals and is used as a structural material in missiles as well as for components for electronic tubes. Its most serious drawback is that it becomes embrittled in the recrystallized condition at temperatures below approximately 20 degrees C.

* * *

The successful alloying of rhenium and molybdenum represents a happy combination of the best characteristics of both metals. The alloys have better mechanical properties than either rhenium or molybdenum. Elevated temperature strength exceeds that of molybdenum while very good ductility is retained all the way down to the cryogenic temperature range (to –450 degrees F) without embrittlement. Most of the failures in filaments, grids, and heaters in electronic tubes result from embrittlement of the wire caused by recrystallization at high temperatures, which can cause failures in

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* * *

Rod, wire and strip products now are available from Chase in 50 Re-50 Mo and 40 Re-60 Mo (wt %) alloys.

Moroccan Wire Production Growing

Draht-Welt records that the reported statistics of the production development in Morocco show a decided increase, in which the small wire industries share. Wire drawing increased from 4820 tons in 1956 to 7470 tons in 1958, and in 1959 to a total of 8100 tons. In this connection one should not overlook that only 24 firms are active with around 3500 employees. A strict differentiation of the operations of the industries does not exist, and the production of any one firm is not limited to a particular product.

* * *

In metal working, if the production index for 1958 is set at 100, that of 1959 stands at 85, for pipes and concrete reinforcing bars and mesh at 83. Of the total national income, industry and handicraft account for 33%. Significantly increased are the investments in which the state as well as foreign companies have joined.

German Nail Industries Plan Production in India

The Rhein Nail Group, a holding company, to which Rhenish nail factories in Aix-la-Chapelle belong, aims to establish a manufacturing business in India, General Director **Herbert Pavel** has disclosed after his return from an East Asian journey.

* * *

Between representatives of the government of Mysore and the Demag Company a contract has been concluded for the construction of an oxygen blast steel works with a capacity of 100,000 tons of raw steel. The plant consists of two converters, an electric arc furnace, a three-high blooming mill train with 26¾ inch diameter and a three-stand intermediate rolling mill of 23.6 inch diameter for the production of girders. It will be completed by an oxygen plant, a lime kiln, crane installation, etc. The total investment will run up to $17.5 Million.

Thermocouples in Missiles

The increasing use of materials at high temperatures in missile and nuclear power applications has made new demands on thermocouples for such applications. A growing number of ASTM methods are specifying thermocouples for temperature measurement. The requirements now specified have been reviewed, and a paper on "Thermocouples and Their Usage in ASTM Standards" will be submitted for possible publication in Materials Research & Standards. This was one of several topics reviewed by ASTM Committee E-1 on Methods of Testing.

* * *

A manual now in preparation

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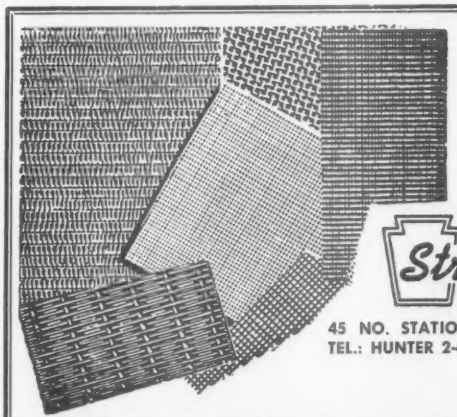

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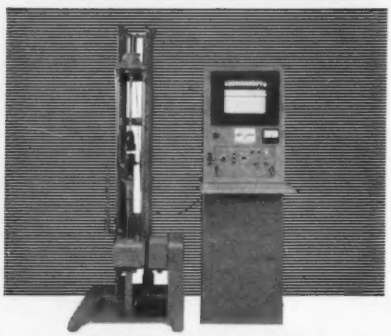

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will present up-to-date information on the newer thermocouple materials as well as standard thermocouples, which will present current information on measurement; principles of thermoelectricity; Thermoelectric materials; and fabrication, installation, and use of all types of thermocouples. Standard methods are now under development for the comparison calibration of thermocouples and for testing thermocouple element materials by comparison to a secondary standard of similar composition.

New Exposure Program For Coated Wire

An atmospheric corrosion research program covering 65 types of aluminum- and zinc-coated wire and wire products has been approved by ASTM Committee A-5 on Corrosion of Iron and Steel. Specimens will be exposed at seven sites in the summer of 1961.

* * *

Two new specifications have been prepared for zinc-coated flat steel armor tape, and for copper-covered steel wire strand. A tolerance limit for the size of mesh in chain length fencing (A 392) is being considered.

* * *

A report covering the 1960 inspections of aluminum- and zinc-coated hardware exposed in 1958 has been completed and will be published with the 1961 Annual Report of the committee. The 22- and 24-year atmospheric corrosion data of zinc-coated wire and wire products is also being assembled for publication.

B.H.P. Marks 75 Years Of Growth and Progress

The Broken Hill Proprietary Company Ltd., Melbourne, Australia, commemorated its 75th Anniversary with the publication of a 192 page book describing the development of the company through the three-quarter century period ending in 1960.

* * *

The company was incorporated in Victoria on August 13, 1885, to mine the silver-lead ores of Broken Hill. In the intervening years the business made a transition from silver to steel to become Australia's largest business enterprise. It now involves a number of subsidiaries and associated companies engaged in the production of steel and a wide variety of steel products and in several auxiliary projects, such as mining and shipbuilding. Not the least among the company's categories of products is a line of rod, wire and wire products, for the manufacture of which extensive facilities have been provided.

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Wire Products Firm Moves Into Larger Plant

Completion of major construction on its plant expansion has been announced by **W. E. Pipkorn Manufacturing Company,** maker of formed wire products, custom wire fabrications and production aids. The new plant is located at 2211 West County Road D, St. Paul 12, Minn.

* * *

The firm's four production departments — custom wire fabrications, formed wire products, pro-

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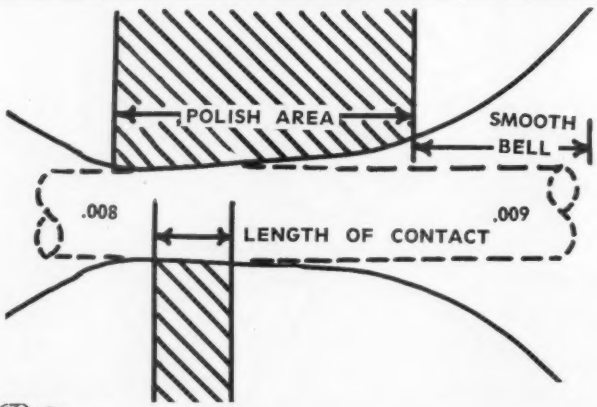
duction aids, and finishing—report marked improvements in operating efficiency.

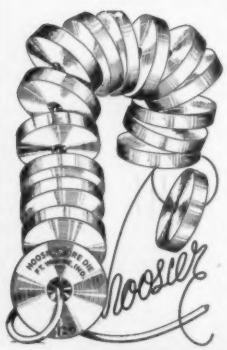
* * *

The finishing department in particular has benefitted greatly by the expansion. A large new conveyorized radiant gas-fired oven was installed. Used chiefly for curing polyvinylchloride (PVC) coatings, the oven produces heat up to 3,000,000 B.T.U.'s. Together with other finishing equipment, the oven can process a carload of wire goods every four days.

* * *

WEPCO management (**Werner E. Pipkorn,** chairman; **Gordon L. Simonson,** president) believes its expanded finishing department to be the largest and best-equipped operation in the Upper Midwest for polyvinylchloride (PVC) plastic coating of metal and plastic parts.





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MACHINE COMPANY
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An Employment Office in The Wire Industry: Some Aspects of its Responsibilities

(*Continued from page 621*)

stands as concrete evidence of the fulfilment of the pioneer efforts made by a handful of Whitecross employees half a century ago.

* * *

Most Departments hold an Annual Bowling Main which usually constitutes a Saturday half day outing. This is the "all male" social event of the Summer, and it is pleasing to note that some sections make a point of inviting their own particular pensioners. The Departments are given a financial grant by the Company, and the contribution is based on a fixed amount per head to ensure fairness. This is added to the "all-the-year-round" savings of the employees. Sometimes the Employment Office is requested to act as Banker, but in any case is always willing to help in any capacity necessary to assist preparations.

* * *

A new feature introduced last year, was the "Over 40's" Sport Day and Tea. This was an outstanding success. A Dance in the evening formed the second part of the venture, most participants being of the older type. The trophy of the evening, presented as a Spot Prize was a bottle of a brand of well known tablets guaranteed to "fortify". Mounted on a plinth we think the makers would have been astonished to recognize the graceful lines of their product.

* * *

We find that a criticism received after some affairs is that most groups are rather intolerant of the activities of other generations. It therefore followed, that on this occasion the outlook was almost uniform and everybody thoroughly enjoyed themselves.

* * *

In contrast to the "Over 40's" event, our learners from the Training School have a special Prize Giving Distribution and Dance. The prizes are awarded on the results of the examinations set by each Department to which the

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learner has been attached during his period of training. To make the evening more enjoyable all female staff under 21 are invited.

VI Conclusion

I think the foregoing will give a broad outline of the diversity of the off-stream of industry handled by our Employment Office. There are many considerations which we have not dealt with—office cleaners and the need for extreme tact, post boys with their peculiarities and pecadilloes, protective clothing and the need for careful scrutiny of claims, details of Army Reserves, Territorials, Pension Papers and References, Flag Days, Charities and the hundred and one requests which are dealt with by us.

* * *

It will, however, be sufficient to prove, whether on simple or pretentious lines, call it what you will, Employment, Labour, Welfare or Personnel Office, this Department is essential for the smooth running of a Company.

* * *

In conclusion, I should like to thank Messrs. Frederick Smith & Company for the opportunity of submitting this paper and to my own employers for their encouragement and co-operation.

New Bulletin Describes Line of Mesh Belt Furnaces

A bulletin published by **Harper Electric Furnace Corporation,** describes and illustrates a modernized line of 17 Straight-Thru Mesh Belt Furnaces for continuous brazing, annealing, and sintering operations.

* * *

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* * *

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WHERE TO BUY

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ABRASIVES—
Alabama Wire Die Co., Fayette, Ala.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

ABRASIVES— Shot & Grit, For Cleaning
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

ACID INHIBITORS—
(See Inhibitors, Pickling)

ANNEALING MACHINES — Electric Resistance
Syncro Machine Co., Perth Amboy, N. J.

ANNEALING POTS AND BOXES—
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.

BAKERS—
(See OVENS—Rod Bakers)

BAR—Steel
Eaton Mfg. Co., Massillon, Ohio

BOBBINS—Braider & Wire Weaving
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Plastic Mold & Engineering Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

BORAX—Wire Drawing
U. S. Borax, New York, N. Y.

BRAZERS—Electric for Wire
Steele Company, M. G., Rome, N. Y.

CABLE ACCESSORIES
Southwire Co., Carrollton, Ga.

CABLE—Electric
Laribee Wire Inc., Camden, N. Y.
Southwire Co., Carrollton, Ga.

CABLE FILLERS—Paper
Ludlow Corporation, Needham Heights, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

CAPSTANS—for Wire (also Caterpiller Types)
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Div. of Franklin Research and Development Corp., Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.

CARRIERS—Braider, High Speed
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

CASTINGS—Wire Mill
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.

CEMENTS—Refractory
Amchem Products, Inc., Ambler, Pa.

CLEANERS—Metal
Apex Alkali Products Co., Phila., Pa.
Circle Chemical Co., Chicago, Ill.
Magnuson Products Corporation, Brooklyn, N. Y.
Miller, R. H., Co., Inc., Homer, N. Y.
Parkin Chemical Co., The, Pittsburgh, Pa.
Standard Industrial Compounds Co., Frankfort, Ill.

CLEANING & PICKLING EQUIP.—
Cleveland Tramrail Div., of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.
Wheelabrator Corporation, Mishawaka, Ind.
Wilson, Lee, Engr. Co., Cleveland, Ohio

CLOTH—WIRE, All Metals
Hudson Wire Co., Pequot Div., Norwalk, Conn.
Wickwire Bros., Cortland, N. Y.
Wisconsin Wire Works, Appleton, Wis.

COATING COMPOUNDS—
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Miller, R. H., Co., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
U. S. Borax, New York, N. Y.

COLOR CONCENTRATES—For Wire Coatings
Blane Corporation, The, Canton, Mass.

COMPOUNDS—Brazing
Steele Company, M. G., Rome, N. Y.

COMPOUNDS—Coppering
Amchem Products, Inc., Ambler, Pa.
Circle Chemical Co., Chicago, Ill.
Miller, R. H. Co., Inc., Homer, N. Y.

COMPOUNDS—Diamond (Pre-Mixed)
Alabama Wire Die Co., Fayette, Ala.
Eastern Carbide Corp., New Rochelle, N. Y.
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Indiana Wire Die Co., Ft. Wayne, Ind.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

COMPOUNDS—Extrusion, for Wire
Amchem Products, Inc., Ambler, Pa.
Blane Corporation, The, Canton, Mass..
Circle Chemical Co., Chicago, Ill.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

COMPOUNDS—For Improving Drawing & Extrusion
Amchem Products, Inc., Ambler, Pa.
Circle Chemical Co., Chicago, Ill

COMPOUNDS—Metal Finishing
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Circle Chemical Co., Chicago, Ill.

COMPOUNDS—Phosphate Coating
Amchem Products, Inc., Ambler, Pa.
Circle Chemical Co., Chicago, Ill.

COMPOUNDS—Rust Preventing
Amchem Products, Inc., Ambler, Pa.
American Lanolin Corp., Lawrence, Mass.
Apex Alkali Products Co., Philadelphia, Pa.
Circle Chemical Co., Chicago, Ill.

COMPOUNDS—Rust Removing
Amchem Products, Inc., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Magnuson Products Corp., Brooklyn, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

COMPOUNDS—Vinyl
Blane Corporation, The, Canton, Mass.
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.

COMPOUNDS—Wire Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Climax Molybdenum Co., Div., American Metal Climax, Inc., New York, N. Y.
Magnuson Products Corp., Brooklyn, N. Y.
Miller, R. H. Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.
Swift & Company, Chicago, Ill.
U. S. Borax, New York, N. Y.

CONDUCTORS—Flexible, Electrical
Hudson Wire Co., Ossining, N. Y.
Laribee Wire Inc., Camden, N. Y.
Montgomery Co., The, Windsor Locks, Conn.

CONTAINERS—Wire Packaging
(See DRUMS—Wire Packaging)

COPHOLDERS—Steel
Apco Mossberg Co., Attleboro, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

CORDS—Electrical, Tinsel Conductor
Montgomery Co., The, Windsor Locks, Conn.

COUNTERS—
(See MACHINERY—Measuring Wire and Cable)

CRANES—Wire Mill
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio
Morgan Construction Co., Worcester, Mass.

CUTTING TOOLS—Carbide
Eastern Carbide Corp., New Rochelle, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

CUTTING TOOLS—Wire
Manco Mfg. Co., Bradley, Ill.
Robinson, M. W. Co., Rockville, Conn.

DIAMONDS—Industrial
Alabama Wire Die Co., Fayette, Ala.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Indiana Wire Die Co., Ft. Wayne, Ind.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDERS—
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Hyprez Div., Engis Equipment Co., Chicago, Ill.
Kelly Wire Die Corp., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIAMOND POWDER RECLAIMING—
Alabama Wire Die Co., Fayette, Ala.
Danforth Company, C.W., Youngstown, Ohio
Elgin National Watch Co., Abrasives Div., Elgin, Ill.
Fort Wayne Diamond Products, Inc., Fort Wayne, Indiana
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DIAMOND TOOLS—
Wayne Wire Die Co., Linden, N. J.

DIES—Carbide, Tungsten & Tantalum
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Cold Heading
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.

DIES—Diamond
Alabama Wire Die Co., Fayette, Ala.
Ajax Industrial Supplies, Inc., Ft. Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J. Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Ft. Wayne Wire Die Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Fort Wayne, Ind.
Indiana Wire Die Co., Fort Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES DIAMOND—Controlled Drawing Angle
Hoosier Wire Die, Inc., Fort Wayne, Ind.

DIES DIAMOND—Reversible
National Wire Die Co., Inc., New York, N. Y.

DIES—Extrusion
Alabama Wire Die Co., Fayette, Ala.
Central Tool and Machine Co., Bridgeport, Conn.
Eastern Carbide Corp., New Rochelle, N. Y.
Indiana Wire Die Co., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N.Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Eyelet
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Nail, Nail Cutters, Feeder Blocks, Grippers, etc.
Pittsburgh Carbide Die Co., Monongahela, Pa.

DIES—Pointing
Fenn Manufacturing Co., Newington, Conn.
Sjogren Tool & Machine Co., Auburn, Mass.

DIES—Repairs & Re-Cutting
Ajax Industrial Supplies, Inc., Fort Wayne, Ind.
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Boulin, Victor J., Inc., New York, N. Y.
Brenon, Inc., Nixon, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Ft. Wayne Wire Die, Inc., Fort Wayne, Ind.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
National Wire Die Co., Inc., New York, N. Y.
New England Wire Die Co., Worcester, Mass.
Roux Wire Die Works, Inc., Oriskany, N. Y.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.
Wayne Wire Die Co., Linden, N. J.

DIES—Special Shapes, Etc.
Eastern Carbide Corp., New Rochelle, N. Y.
Kelloy Corporation, New York, N. Y.

DIES—Swaging
Fenn Manufacturing Co., Newington, Conn.
Sjogren Tool & Mach. Co., Inc., Auburn, Mass.

DIES—Tinning
Roux Wire Die Works, Inc., Oriskany, N. Y.

DIES—Tube Drawing
Balloffet-Vianney Wire Die Co., Inc., Guttenberg, N. J.
Eastern Carbide Corp., New Rochelle, N. Y.
Hoosier Wire Die, Inc., Ft. Wayne, Ind.
Kelloy Corporation, New York, N. Y.
Kelly Wire Die Corp., New York, N. Y.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Rusch Wire Die Corp., Croton-on-Hudson, N. Y.

DRAW BENCHES—
(See MACHINERY—Draw Benches)

DRIVES—Variable Speed
Allis Co., Louis, Milwaukee, Wisc.

DRUMS—Wire Packaging
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

DRUMS & TRAVERSES—For Cable Reels
Hubbard Spool Company, Div., Van Norman Industries, Inc., Garrett, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio

DRYING EQUIPMENT—
Carl Mayer Corp., The, Cleveland, Ohio

DUST COLLECTORS—Wet or Dry
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

ENGINEERS—Consulting
Bawden, William D., Wilton, Conn.

EYELETS—Brass or Zinc
Platt Bros. & Co., The, Waterbury, Conn.

FOAM PRODUCING COMPOUNDS—
Amchem Products, Inc., Ambler, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

FURNACES—Annealing, Vacuum
American Laubscher Corporation, New York, N. Y.

FURNACES—Brazing
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Galvanizing Equipment
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)
Wilson, Lee, Engr. Co., Cleveland, Ohio

FURNACES—Heat Treating
Ajax Electric Company, Philadelphia, Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)
Wilson Lee Engr. Co., Cleveland, Ohio

FURNACES—Pot (Oil, Gas, Electric)
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)

FURNACES—Salt Bath
Ajax Electric Company, Philadelphia, Pa.

FURNACES—Strand Annealing
Ajax Electric Company, Philadelphia, Pa.
Ofenbau Fritz, G.m.b.H. & Co., K. G., Hagen, (W. Germany)

GALVANIZING EQUIPMENT—(See MACHINERY—Galvanizing Wire)

GUIDES—For Wire
Alabama Wire Die Co., Fayette, Ala.
Heany Industrial Ceramic Corp., New Haven, Conn.
Indiana Wire Die Co., Fort Wayne, Ind.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool & Machine Co., Auburn, Mass.

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

INHIBITORS—Pickling
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INKS—Printing, for Insulated Wire
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Company, West Hanover, Mass.

INSULATING MATERIALS—
Blane Corporation, The, Canton, Mass.
Dow Corning Corporation, Midland, Mich.
General Electric Company, Insulating Materials Section, Schenectady, N. Y.
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

LACQUERNG SYSTEMS—See MACH.—Lacquering Electric Wire

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LUBRICANTS—For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Standard Industrial Compounds Co., Frankfort, Ill.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Climax Molybdenum Co., Div., American Metal Climax, Inc., New York, N. Y.
Swift & Co., Chicago, Ill.

MACHINE CONTROLS—Electronic
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Armoring (Cable, Wire, Hose)
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

MACHINERY—Barbed Wire
Glader Wm., Machine Works, Chicago, Ill.

MACHINERY—Blast Cleaning
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.

MACHINERY—Bobbin Winders
Hanson & Edwards, Ltd., Warrington, England

MACHINERY—Bolt, Rivet, Screw, etc.
Gavlick Machinery Corporation, Bridgeport, Conn.
National Machinery Co., Tiffin, Ohio
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Braiding
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Wardwell Braiding Machine Co., Central Fall, R. I.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Brazers for Wire
Steele Company, M. G., Rome, N. Y.

MACHINERY—Bunching
Cook Mfg. Co., The, Paterson, N. J.
Edmands Company, The, Cranston, R. I.
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Philadelphia, Pa.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Cable, Electric
Cook Mfg. Co., The, Paterson, N. J.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Division of Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Capstans and Machinery—Winding Wire)

MACHINERY—Centerless Grinding & Polishing
American Laubscher Corp., New York, N. Y.

MACHINERY—Chain Link Fence
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Chain Making
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Closing Cable
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A. Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Coulter & MacKenzie Machine Co., Bridgeport, Conn.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Cold Forging
National Machinery Co., Tiffin, Ohio
Unitech Products, Inc., Hartford, Conn.

MACHINERY—Cold Heading
National Machinery Co., Tiffin, Ohio
REM Sales Incorporated, Subsidiary of The Robert E. Morris Co., West Hartford, Conn.
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Cook Mfg. Co., The, Paterson, N. J.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., New York, N.Y.
Morgardshammars Mek Verkstads A. B., Morgardshammar, Sweden
National Mach'y Exch., (Used), New York
Showa Machine Works, Ltd., Osaka, Japan
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)
Eisler Engineering Company, Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Cutters, Hydraulic for Rod & Bar
Manco Mfg. Co., Bradley, Ill.

MACHINERY—Dead Block (Stationary Coiler)
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wells Company, Frank L., Kenosha, Wisc.
Whitacre Corporation, Alhambra, California
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Descaling Rod, Dry
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fisher Associates, New York, N. Y.
Herborn Machinery Corporation, Hackensack, N. J.
Pangborn Corporation, Hagerstown, Md.
Wheelabrator Corporation, Mishawaka, Ind.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Die Making
Alabama Wire Die Co., Fayette, Ala.
Boulin, Victor J., Inc., New York, N. Y.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Indiana Wire Die Co., Ft. Wayne, Ind.
Metallurgical Products Dept. of General Electric Co., Detroit, Mich.
Sjogren Tool & Machine Co., Auburn, Mass.
Wayne Wire Die Co., Linden, N. J.

MACHINERY—Draw Benches
American Laubscher Corp., New York, N. Y.
Gavlick Machinery Corporation, Bridgeport, Conn.
Loma Machine Manufacturing Co., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Edging (See MACHINERY—Tandem Rolling and Edging Mills)

MACHINERY—Enameling
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Cook Mfg. Co., The, Paterson, N. J.
Cold Forging Machines, Inc., Elyria, Ohio
Litzler Co., C. A., Cleveland, Ohio

MACHINERY—Extruding
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Johnson Machinery Co., Elizabeth, N. J.
Royle, John, & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Flat Wire
Fenn Manufacturing Co., Newington, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Loma Machine Manufacturing Co., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Equipment Company, Cleveland, Ohio
Torrington Mfg. Co., Torrington, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Forming Wire
Cold Forging Machines, Inc., Elyria, Ohio
Gavlick Machinery Corporation, Bridgeport, Conn.
National Mach'y Exch., (Used), New York, N. Y.
Straus-Artys Corp., Great Neck, N. Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Galvanizing Wire
Miyazaki Iron Works, Ltd., Osaka, Japan
Ofenbau Fritz G.m.b.H. & Co., K. G., Hagen, (W.-Germany)
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle Manufacturing Corporation, Providence, R. I.

MACHINERY—Insulating Wire
American Insulating Mach'y. Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Litzler Co., C. A., Cleveland, Ohio
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine), France
Royle, John & Sons, Paterson, N. J.
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Insulation Testing (See MACHINERY—Spark Testing)

MACHINERY—Lacquering Electric Wire
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio

MACHINERY—Lock Washer
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Looms, Wire Weaving
Cold Forging Machines, Inc., Elyria, Ohio
EVG., Machinen & Stahl, A. G., Zurich, Switzerland

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wisc.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

MACHINERY—Measuring and Control—Coating
Davis-Standard, Div. of Franklin Research and Development Corp., Mystic, Conn.

MACHINERY—Nail and Tack
Cold Forging Machines, Inc., Elyria, Ohio
Glader, Wm., Machine Works, Chicago, Ill.
National Machinery Co., Tiffin, Ohio
National Mach'y Exch. (Used), N.Y., N.Y.
Wafios Machinery Corp., Hackensack, N. J.

MACHINERY—Packaging Wire
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California

MACHINERY—Patenting Wire
Ofenbau Fritz G.m.b.H. & Co., K. G., Hagen, (W.-Germany)
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Whitacre Corporation, Alhambra, California

MACHINERY—Pin
REM Sales Incorporated, Subsidiary of The Robert E. Morris Company, West Hartford, Conn.

MACHINERY—Plating
Bartell Machine Tool Corp., Rome, N. Y.
Cold Forging Machines, Inc., Elyria, Ohio
Universal Industrial Equipment Co., Secaucus, N. J.

MACHINERY—Pointing
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch., (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Straus-Artys Corp., Great Neck, N. Y.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.

MACHINERY—Printing on Electric Wire
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

MACHINERY—Re-Spooling
Acrometal Products, Inc., Minneapolis, Minn.
Bartell Machine Tool Corp., Rome, N. Y.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
National Mach'y Exch. (Used), New York, N. Y.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used), Pawtucket, R. I.

MACHINERY—Rod Mill
Herborn Machinery Corporation, Hackensack, N. J.
Morgan Construction Co., Worcester, Mass.

MACHINERY—Rolling Mill
Fenn Manufacturing Co., Newington, Conn.
Loma Machine Manufacturing Co., New York, N. Y.
Morgan Construction Co., Worcester, Mass.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Rubber Insulating
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Litzler Co., C. A., Cleveland, Ohio.
Royle, John & Sons, Paterson, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.
Wire & Textile Mach'y Inc., (used), Pawtucket, R. I.

MACHINERY—Serving
Pourtier Pere et Fils, Romainville (Seine), France
Wardwell Braiding Machine Co., Central Falls, R. I.

MACHINERY—Slitting Mills
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Steel Equipment Company, Cleveland, Ohio

MACHINERY—Special
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.

MACHINERY—Spring Making
Cold Forging Machines, Inc., Elyria, Ohio
Gavlick Machinery Corporation, Bridgeport, Conn.
National Mach'y Exch., (Used), New York, N. Y.
Torrington Mfg. Co., Torrington, Conn.
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Straightening & Cutting
American Laubscher Corp., New York, N. Y.
Cold Forging Machines, Inc., Elyria, Ohio
Gavlick Machinery Corporation, Bridgeport, Conn.
Johnson Machinery Co., Elizabeth, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Loma Machine Manufacturing Co., New York, N. Y.
Mettler Machine Tool Co., New Haven, Conn.
National Mach'y Exch. (Used), New York, N.Y.
Patterson, George C., Machine Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wafios Machinery Corp., Hackensack, N. J.
Wells Company, Frank L., Kenosha, Wisc.

MACHINERY—Stranding
Bartell Machine Tool Corp., Rome, N. Y.
Cold Forging Machines, Inc., Elyria, Ohio
Hanson & Edwards, Ltd., Warrington, England
Haskell-Dawes Machine Co., Phila., Pa.
Johnson Machinery Co., Elizabeth, N. J.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Superior Tool & Manufacturing Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Fenn Manufacturing Co., Newington, Conn.
Gavlick Machinery Corporation, Bridgeport, Conn.

MACHINERY—Tandem Rolling & Edging Mills
Fenn Manufacturing Co., Newington, Conn.
Loma Machine Manufacturing Co., New York, N. Y.
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.

MACHINERY—Take-Up and Pay-Out
Acrometal Products, Inc., Minneapolis, Minn.
American Insulating Mach'y Co., Phila., Pa.
Bartell Machine Tool Corp., Rome, N. Y.
Colbourne Machine Company, Winsted, Conn.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Division of Franklin Research and Development Corporation, Mystic, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Fenn Manufacturing Co., Newington, Conn.
Johnson Machinery Co., Elizabeth, N. J.
Litzler Co., C. A., Cleveland, Ohio.
Miyazaki Iron Works, Ltd., Osaka, Japan
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.
Watson Machine Co., Paterson, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Pourtier Pere et Fils, Romainville (Seine) France
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Thread Rolling
Mettler Machine Tool, Inc., New Haven, Conn.
Straus-Artys Corp., Great Neck, N. Y.
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Tinning Wire
American Insuating Mach'y Co., Phila., Pa
Cook Mfg. Co., The, Paterson, N. J.
Litzler Co., C. A., Cleveland, Ohio

Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)
Universal Industrial Equipment Co., Secaucus, N. J.
Whitacre Corporation, Alhambra, California

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio

MACHINERY—Tube Mill, Cold Drawing
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., New York, N. Y.
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N.J.
Edmands Company, The, Cranston, R. I.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
Gavlick Machinery Corporation, Bridgeport, Conn.
Johnson Machinery Co., Elizabeth, N. J.
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.
Wire Machinery, Inc., Chicago, Ill.

MACHINERY—Variable Speed Drives
Allis Co., Louis, Milwaukee, Wisc.

MACHINERY—Welded Wire Mesh
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Sommer Products Company, Peoria, Ill.

MACHINERY—for Wire Welding
(See WELDERS—Butt and Spot and Machinery—Welding Wire Fabrics)

MACHINERY—Winding Wire
Davis Electric Co., Wallingford, Conn.
Davis-Standard Div. of Franklin Research and Development Corp., Mystic, Conn.
Emory Company, Robert J., Newark, N. J.
Enjaco Corporation, Cranston, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Miyazaki Iron Works, Ltd., Osaka, Japan
New England Butt Co., Division Wanskuck Co., Providence, R. I.
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Standard Mill Supply Co., Pawtucket, R. I.
Steel Equipment Company, Cleveland, Ohio
Straus-Artys Corp., Great Neck, N. Y.

MACHINERY—Wire Drawing
American Laubscher Corporation, New York, N. Y.
Cook Manufacturing Co., The, Paterson, N.J.
Coulter & McKenzie Machine Co., Bridgeport, Conn.
Fenn Manufacturing Co., Newington, Conn.
Gavlick Machinery Corporation, Bridgeport, Conn.
Herborn Machinery Corporation, Hackensack, N. J.
Johnson Machinery Co., Elizabeth, N. J.
Loma Machine Manufacturing Co., New York, N. Y.
Miyazaki Iron Works, Ltd., Osaka, Japan
Morgan Construction Co., Worcester, Mass.
Morgardshammars Mek Verkstads AB, Morgardshammar, Sweden
National Mach'y Exch. (Used), New York, N. Y.
Norton & Co., Ltd., Sir James Farmer, Manchester, England
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Showa Machine Works Ltd., Osaka, Japan
Societa Generale Delle Macchine Mill, Milan, Italy
Stanat Mfg. Co., Inc., Westbury, L. I., N. Y.
Straus-Artys Corp., Great Neck, N. Y.
Superior Tool & Machinery Company, Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Mach'y Co., Cuyahoga Falls, Ohio
Wartenweiler, Emilio, Milano, Italy—SAMP
Waterbury-Farrel Fdy. & Mach. Co., Inc., Div. of Textron, Inc., Waterbury, Conn.
Watkins & Sons, Inc., R. S., Sandy Hook, Conn.
Whitacre Corporation, Alhambra, California
Wire Machinery Inc., Chicago, Ill.

MACHINERY—Wire Rope
Niehaus, K. A., Maschinenfabrik, Dusseldorf-Rath, Germany
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
American Laubscher Corp, New York, N. Y.
Larmuth (1947) Ltd., Cheshire, England

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, Ohio

MOTORS—Electric
Allis Co., Louis, Milwaukee, Wisc.

NAIL TOOLING—Tungsten Carbide
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

NIPPERS—Wire Cutting
Robinson, M. W. Co., Rockfall, Conn.

NOZZLES—For Extruding Machines
Central Tool and Mach. Co., Bridgeport, Conn.

OVENS—Cable Lacquering and Enameling
American Insulating Mach'y Co., Phila., Pa.
Carl Mayer Corp., The, Cleveland, Ohio
Colbourne Machine Co., Winsted, Conn.

OVENS—Rod Bakers
Carl Mayer Corp., The, Cleveland, Ohio

OVENS—Welding Rod Coating
Carl Mayer Corp., The, Cleveland, Ohio

PAILS—Packaging
(See Drums—Wire Packaging)

PAPER—Coil Wrapping
Ludlow Corporation, Needham Heights, Mass.

PAPER—Insulating
Ludlow Corporation, Needham Heights, Mass.
Twitchell, Inc., E. W., Philadelphia, Pa.

PAY-OUT SYSTEMS—
(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS
(See COMPOUNDS—Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PLASTICIZERS—
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.

PLASTICS—for Wire Insulation
Blane Corporation, The, Canton, Mass.
Dow Corning Corporation, Midland, Mich.
Kenrich Petrochemicals, Inc., Maspeth, N. Y.
Monsanto Chemical Company, Plastics Division, Springfield, Mass.
Union Carbide Plastics Company, Div. of Union Carbide Corporation, New York, N. Y.
Union Carbide Corporation, Silicones Division, New York, N. Y.

PRINTING WHEELS—for Electric Wire
Daniels & Co., Frank, New York, N. Y.
Entwistle Manufacturing Corporation, Providence, R. I.
Gem Gravure Co., Inc., West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

PULLERS AND GRIPS—for Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry. & Mach. Co., Trenton, N. J.
Sjogren Tool & Mach. Co., Auburn, Mass.

RACKS—Wire Storage
Jarke Manufacturing Co., Chicago, Illinois

REEL AND TENSION STANDS—
Acrometal Products, Inc., Minneapolis, Minn.
Mettler Machine Tool, Inc., New Haven, Conn.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Standard Mill Supply Co., Pawtucket, R. I.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Republic Steel Corp., Berger Div., Canton, Ohio

REELS & SPOOLS—Custom Made
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.

REELS—Metal Bound
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS—Plywood
Antrim Reel, Inc., Haverhill, Mass.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Carlton Manufacturing Co., Pawtucket, R. I.
Clark Manufacturing Co., J. L., Rockford, Illinois
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co. Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.
Nelson Co., The, Baltimore, Md.
Northern Indiana Steel Supply Co., Michigan City, Ind.
Republic Steel Corp., Berger Div., Canton, Ohio
Wardwell Braiding Machine Co., Central Falls, R. I.

REELS & SPOOLS—Wood
American Wood Working Co., Montello, Wisc.
Antrim Reel, Inc., Haverhill, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Durkee Mfg. Co., Inc., Pine River, Minn.
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Nelson Co., The, Baltimore, Md.

ROD BAKERS—
(See OVENS—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Eaton Mfg. Co., Massillon, Ohio
Keystone Steel & Wire Co., Peoria, Ill.
Niederrheinische Huette, A. G., Duisburg, Germany
Sumitomo Metal Industries, Ltd., Osaka, Japan
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Yawata Iron & Steel Co., Ltd., Tokyo, Japan

ROPE—Wire
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Roebling's, John A. Sons, Div., Colorado Fuel & Iron Corp., Trenton, N. J.

RUST PROOF COMPOUNDS—
(See COMPOUNDS—RUST Removing)

RUST REMOVING COMPOUNDS—
(See COMPOUNDS—RUST Preventing)

SCRAP WIRE—Bare or Insulated, Bought
Electro Metals Separation Co. Div. of M. J. Stavola & Co., Inc., Danbury, Conn.

SILICONE RUBBER—For Wire Insulation
Dow Corning Corporation, Midland, Mich.

SOAPS—Industrial and Wire Drawing
(See COMPOUNDS—Wire Drawing)

SPOOLS—For Retail Sale of Wire
American Wood Working Co., Montello, Wisc.
Antrim Reel, Inc., Haverhill, Mass.
Carlton Manufacturing Co., Pawtucket, R. I.
Clark Manufacturing Co., J. L., Rockford, Illinois

SPOOLS—Plastic
Hubbard Spool Company Div., Van Norman Industries, Inc., Garrett, Ind.
Merrimac Spool & Reel Co., Inc., Haverhill, Mass.
Plastic Mold & Eng. Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.

STAMPINGS—Steel
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

STOCK STORAGE SYSTEMS—
Jarke Manufacturing Co., Chicago, Illinois

STRAND—Galvanized Steel
Southwire Co., Carrollton, Ga.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.

TANKS—Ceramic, for Galvanizing
Ofenbau Fritz G.m.b.H. & Co. K. G., Hagen, (W.-Germany)

TENSION METERS—for Wire
Boulin Instrument Corp., Pelham, N. Y.
Tensitron, Inc., Harvard, Mass.

TESTERS—INSULATION
(See Testing Equipment—for Dielectric Faults)

TESTING EQUIPMENT—Dielectric Faults in Insulation
Davis Electric Co., Wallingford, Conn.
Enjaco Corporation, Cranston, R. I.
Entwistle Manufacturing Corporation, Providence, R. I.
Federal Manufacturing Company, Wallingford, Conn.
Peschel Electronics, Inc., Patterson, N. Y.

TESTING EQUIPMENT—Physical
Scott Testers, Inc., Providence, R. I.
Steele Company, M. G., Rome, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The, Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper Silver and False Gold Coated, etc.
(See TINSEL-Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

TRANSMISSIONS—Variable Speed (See Adjustable Speed Drives)

TRAVERSE & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Davis Electric Co., Wallingford, Conn.
Emory Company, Robert J., Newark, N. J.
Western Wire & Textile Machinery, Inc., So. San Francisco, Calif.

VARNISHES & LACQUERS—for Electric Wire
General Electric Company, Insulating Materials Section, Schenectady, N. Y.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Division of Wanskuck Co., Attleboro, Mass.

WELDERS—Spot and Butt and Welding Wire Fabrics
Eisler Engineering Corp., Newark, N. J.
EVG, Maschinen and Stahl, A.G., Zurich, Switzerland
Herborn Machinery Corporation, Hackensack, N. J.
Micro Products Co., Chicago, Ill.
Sommers Products Company, Peoria, Ill.

WHEELS—for Printing on Electric Wire
Daniels & Co., Frank, New York, N. Y.
Gem Gravure Company, West Hanover, Mass.
Gillies, Duncan M., Co., Inc., West Boylston, Mass.

WIRE—ACSR
Southwire Co., Carrollton, Ga.

WIRE—Aluminum
Hudson Wire Co., Ossining, N. Y.
Malin & Co., The, Cleveland, Ohio
Southwire Co., Carrollton, Ga.

WIRE—Ball
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Ball & Roller Bearing
Eaton Mfg. Co., Massillon, Ohio

WIRE—Barbed
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

WIRE—Brake Lining
Hudson Wire Co., Ossining, N. Y.

WIRE—Brass and Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Brush
Hudson Wire Co., Ossining, N. Y.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.

WIRE—Building, Electric
Southwire Co., Carrollton, Ga.

WIRE—Bunched and Stranded
Camden Wire Co., Camden, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Cadmium
Stamford Processing Co., Peekskill, N. Y.

WIRE—Cold Heading
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Copper
Camden Wire Co., Camden, N. Y.
Hudson Wire Co., Ossining, N. Y.
Laribee Wire, Inc., Camden, N. Y.
Malin & Co., The, Cleveland, Ohio
Southwire Co., Carrollton, Ga.

WIRE—For Electrical Conductors
Camden Wire Co., Camden, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Flat
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Montgomery Co., The, Windsor Locks, Conn.
Webb Wire Div. Carpenter Steel Co., New Brunswick, N. J.

WIRE—Galvanized
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Roebling's, John A. Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—High Carbon
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Detroit Steel Corporation, Detroit, Mich.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Insulated
Southwire Co., Carrollton, Ga.

WIRE—Manufacturers
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Berger Div., Canton, Ohio
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Rylands Brothers Limited, Warrington, England
U. S. Steel Corp., N. Y., N. Y.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Metalizing
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

WIRE—Music
Malin & Co., The, Cleveland, Ohio

WIRE—Needle
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.

WIRE—Nickel Alloy
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Nickel Silver and Phosphor Bronze
Malin & Co., The, Cleveland, Ohio
Wisconsin Wire Works, Appleton, Wis.

WIRE—Oil Tempered
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—for Prestressed Concrete
Rylands Brothers, Limited, Warrington, England

WIRE—Pin
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.

WIRE—Special Shapes
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Eaton Mfg. Co., Massillon, Ohio
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Spring
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Keystone Steel & Wire Co., Peoria, Ill.
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stainless Steel
American Chain & Cable Co., Page Steel & Wire Div., Monessen, Pa.
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Jones & Laughlin Steel Corp., Stainless and Strip Div., Detroit, Mich.
Malin & Co., The, Cleveland, Ohio
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Nippon Stainless Steel Wire Mfg. Co., Ltd., Osaka, Japan.
Pittsburgh Steel Co., Pittsburgh, Pa.
Webb Wire Div., Carpenter Steel Co., New Brunswick, N. J.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Steel—Also Coppered and Galvanized Steel
American Steel & Wire Div., United States Steel Corp., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Continental Steel Corp., Kokomo, Ind.
Detroit Steel Corporation, Detroit, Mich.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Malin & Co., The, Cleveland, Ohio
Maryland Fine & Specialty Wire Co., Inc., Cockeysville, Md.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Div., Colorado Fuel & Iron Corp., Trenton, N. J.
Rylands Brothers, Limited, Warrington, England
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Denver, Oakland & New York City.
Jones & Laughlin Steel Corporation, Pittsburgh, Pa.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Wisconsin Wire Works, Appleton, Wis.

WIRE—Stranded & Bunched
Hudson Wire Co., Ossining, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Tinned
Camden Wire Co., Camden, N. Y.
Laribee Wire, Inc., Camden, N. Y.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.
Stamford Processing Co., Peekskill, N. Y.

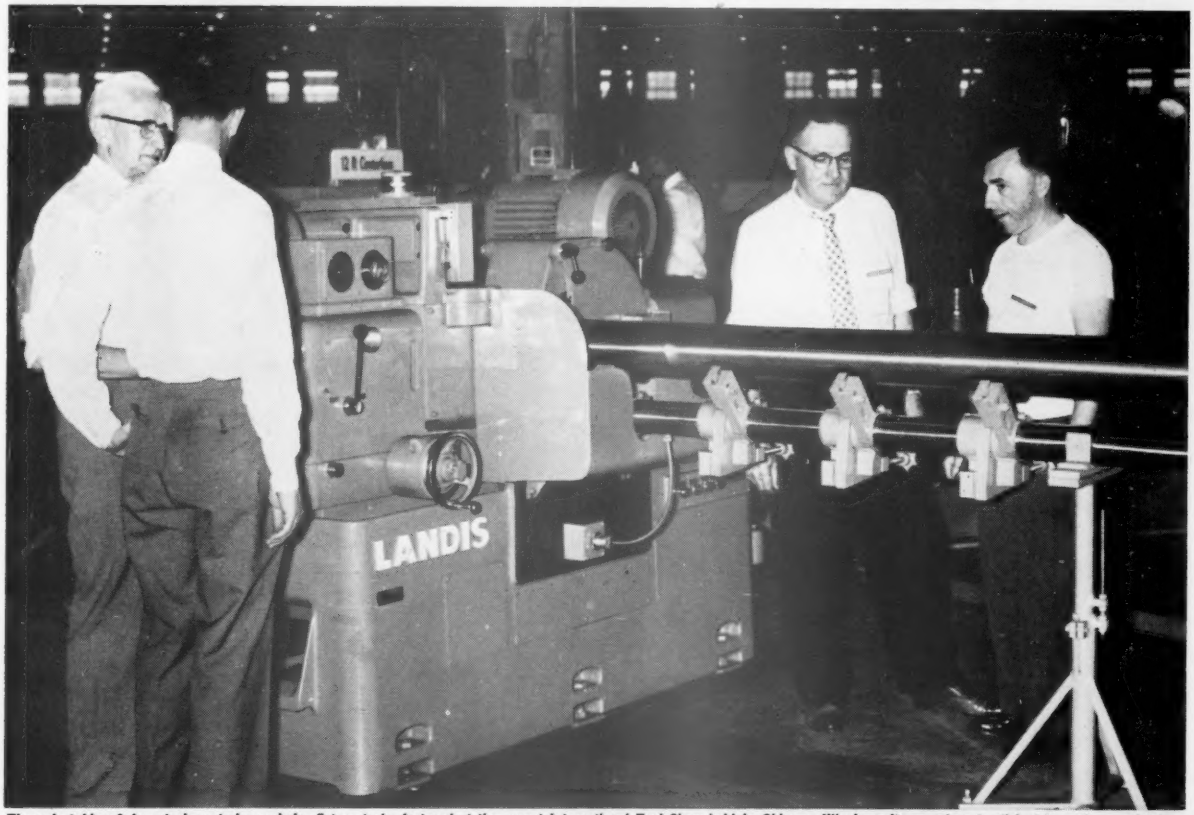
WOOD—for Guide Rolls, Bushings, Wear Parts, etc.
American Wood Working Co., Montello, Wisc.

WRAPPING PAPER—Creped
(See PAPER-Creped Wrapping)

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

YARNS—Wire Insulating
Chadwick Yarn Company, Pawtucket, R. I.
Synthetic Thread Co., Bethlehem, Pa.

Industry's Finest! A. & B. TUBING AND BAR STOCK CENTERLESS GRINDER FIXTURE MAKES IT POSSIBLE TO GRIND FROM ⅛ TO 12 INCH O'D AND HOLD TOLERANCES OF PLUS OR MINUS .001 THE ENTIRE LENGTH OF 52 FEET.



The only tubing & bar stock centerless grinder fixture to be featured at the recent International Tool Show held in Chicago, Illinois as it ground and polished large bars and tubes.

GRINDING AND POLISHING MADE EASIER!!

TO EVERY STEEL MILL, MACHINE SHOP, HYDRAULIC CYLINDER MANUFACTURER, TOOL SHOP OR ANY ONE THAT USES, BUYS OR SELLS STANDARD OR SPECIAL SIZE TUBING OR BAR STOCK MATERIAL REQUIRING A PRECISION GROUND OR POLISHED FINISH...

A BAR STOCK FIXTURE THAT WHEN INCORPORATED WITH ANY CENTERLESS GRINDER, REGARDLESS OF MAKE, AGE OR YEAR!!

WILL! Grind larger O'D size's and longer lengths for a demanding market!

WILL! Make automation possible in steel mills and anywhere required!

WILL! Save setup time!—Convert from one size to another with just a twist of the wrist!

WILL! Save you time and money!

BECAUSE a switch reverses the material direction as it emerges from the grinder and the tube or bar is ground while returning to its original starting point—**thus increasing production and permitting the use of one operator instead of two as normally required on large heavy bars or tubes!!**

OPTIONAL ATTACHMENT (WHICH MAY BE PURCHASED ANY TIME)

WILL! Permit the precision grinding and polishing of tubing or bars with a larger shoulder diameter on one or both ends as well as short or long regular diameter bars or tubes up to 52-foot lengths!

PURCHASED AND USED BY—Bethlehem Steel Co., American Iron & Machine Co., La Salle Steel Co., Westinghouse Air Brake Co., Argonne National Laboratories, Landis Tool Co., Aircraft Certified Eng. Co., etc.;

CURRENTLY USED IN GRINDING AND POLISHING FOR—The following steel warehouses throughout the United States!!

Joseph T. Ryerson & Sons, Inc., Service Steel Co., C. A. Roberts Co., Central Steel & Wire Co., Crucible Steel Company of America, Jones & Laughlin Steel Corp., Pennsylvania Steel Co., etc.;

USED IN PRECISION GRINDING AND POLISHING FOR—The following Missile, Automobile and Machine Tool Manufacturers Nation-Wide!!

American Machine & Foundry Co., Atomic Power Development Association, Bendix Corp., Chrysler Corp., Clark Equipment Co., Dow Chemical Co., Ex-Cell-O Corp., Ford Motor Car Co., Fisher Body Corp., General Motors Corp., Gar Wood Industries, General Electric Co., Haughton Elevator Co., Pratt & Whitney Aircraft, United States Rubber Co., U. S. Army Ordnance Division, etc.

Brochure and Factory Price List will be Mailed Complimentary on Request!!

A. & B. TUBING AND BAR STOCK FIXTURES, INC.

In association with

A. & B. CENTERLESS GRINDING COMPANY

THE WORLD'S LARGEST GRINDER of TUBING and BAR STOCK

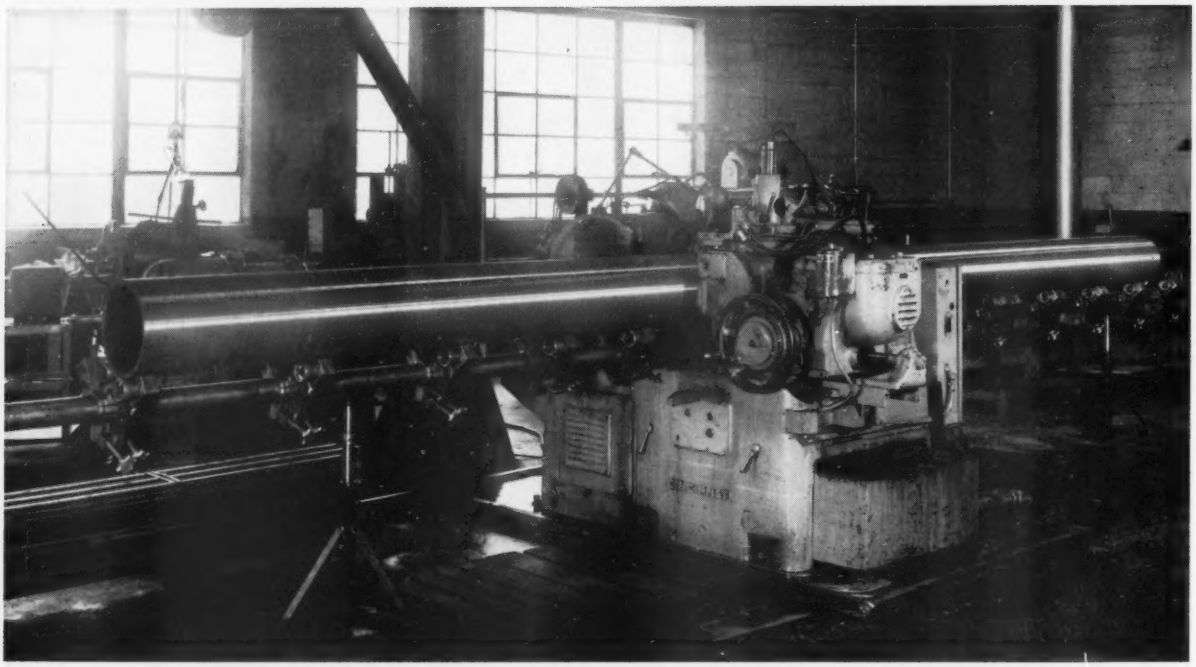
8301 LYNCH ROAD **DETROIT 34, MICHIGAN**

PHONE: 925-2400

KING OF THE GRINDERS

PLEASE TURN PAGE—SEE OTHER SIDE

Industry's Finest! A. & B. TUBING AND BAR STOCK CENTERLESS GRINDER FIXTURE NOW MAKES IT POSSIBLE FOR STEEL MILLS, MISSILE AND MACHINE TOOL MANUFACTURERS TO SUPPLY A DEMANDING MARKET WITH LARGER SIZES OF PRECISION GROUND AND POLISHED BAR STOCK AND TUBING UP TO 12 INCH O'D AND HOLD TOLERANCES OF PLUS OR MINUS .001 THE ENTIRE LENGTH OF 52 FEET, WHILE GIVING A 10 TO 20 MICRO FINISH!



GRINDING AND POLISHING MADE EASIER!!

TO EVERY STEEL MILL, MACHINE SHOP, HYDRAULIC CYLINDER MANUFACTURER, TOOL SHOP OR ANY ONE THAT USES, BUYS OR SELLS STANDARD OR SPECIAL SIZE TUBING OR BAR STOCK MATERIAL REQUIRING A PRECISION GROUND OR POLISHED FINISH

A BAR STOCK FIXTURE THAT WHEN INCORPORATED WITH ANY CENTERLESS GRINDER, REGARDLESS OF MAKE, AGE OR YEAR!!

WILL!!

1. **Save setup time!** Convert from one size to another, with just a twist of the wrist.
2. **A switch reverses the material direction** as it emerges from the grinder and the tube or bar is ground while returning to its original starting point—**thus increasing production and permitting the use of one operator instead of two as normally required!**
3. **Permit grinding and polishing** of bars or tubes **with larger shoulder diameters on one or both ends** if optional attachment is used!
4. **Grind all types of lead screws** from ⅛ to 12-inch diameter up to 52 feet long, before and after threading!
5. **Allow substitution of more economical material**—such as hot rolled bar stock or welded steel tubing or pipe by a simple grinding and polishing operation—**thus saving money!!**
6. **Convert your present centerless grinder,** regardless of make or year, with a minimum of effort!
7. **Make possible the precision grinding and polishing of larger O'D sizes and lengths,** demanded by the missile, machine tool and hydraulic market!
8. **Assure procurement** of special size material, without excessive inventory, due to a minimum size order required by the mill on special O'D sizes!
9. **Increase your capacity to handle larger and more profitable jobs!**
10. **Give you quality workmanship as well as save you time and money!**

REMEMBER!! JUST A TWIST OF THE WRIST—CONVERTS FROM ONE SIZE TO ANOTHER!!
GRINDS AS IT TRAVERSES BOTH WAYS—LESS EFFORT AND INCREASED PRODUCTION WITH LESS MANPOWER!

Brochure and Factory Price List will be Mailed Complimentary on Request!!

A. & B. TUBING AND BAR STOCK FIXTURES, INC.

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THE WORLD'S LARGEST GRINDER of TUBING and BAR STOCK
8301 LYNCH ROAD DETROIT 34, MICHIGAN
PHONE: 925-2400

KING OF THE GRINDERS

PLEASE TURN PAGE—SEE OTHER SIDE

The WATSON MACHINE COMPANY
ESTABLISHED 1845
PATERSON 16, NEW JERSEY, U. S. A.
ELECTRICAL WIRE AND CABLE, WIRE ROPE, CORDAGE
AND MASTICATING MACHINERY MANUFACTURERS

WATSON

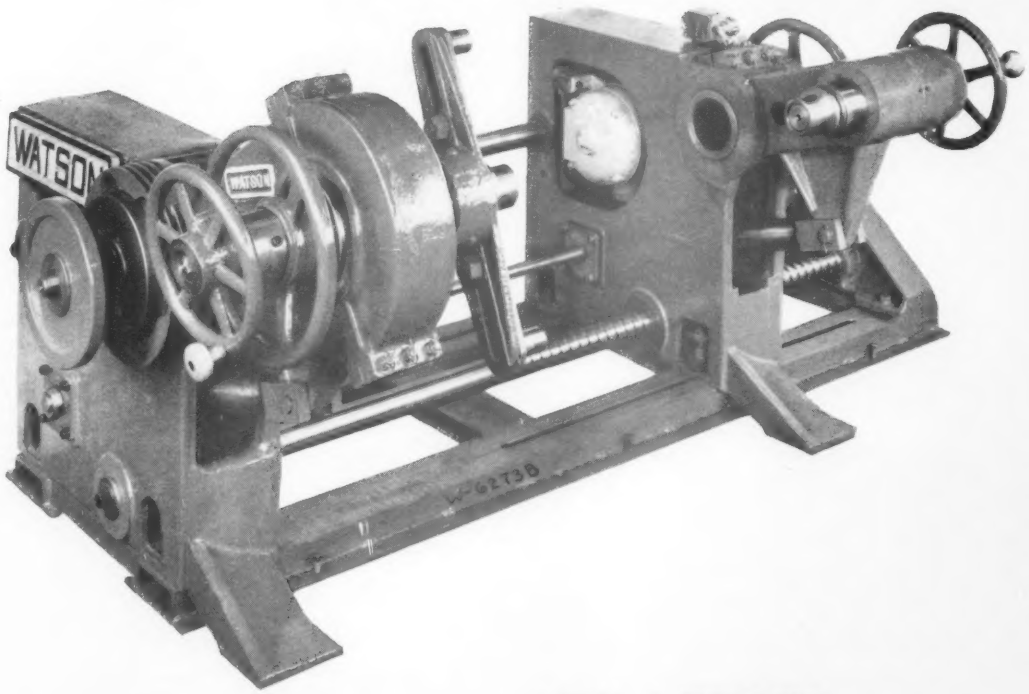
OUR TYPE "R" DESIGNS

U.S. PATENT 2,902,339

FOR "SHAFTLESS"

TAKEUPS -- COILING - REWINDERS -- LETOFFS

FOR REELS FROM 22" TO 84" FLANGE DIAMETER.
FOR ANY PRACTICAL WIDTH.
BASE FLUSH FOR FLOOR MOUNTING. — NO PITS REQUIRED.
FOR HEAVIEST DUTIES & LOADS. TRANSPOSABLE ASSEMBLIES.
MOTORIZED REEL LIFT — MECHANICAL FRAME SHIFT.
RETRACTABLE PINTLES WITH AUTOMATIC LOCK.
SEPARATE DOG DETRACTION.
ULTRA-RAPID AND EFFORTLESS MANIPULATION.



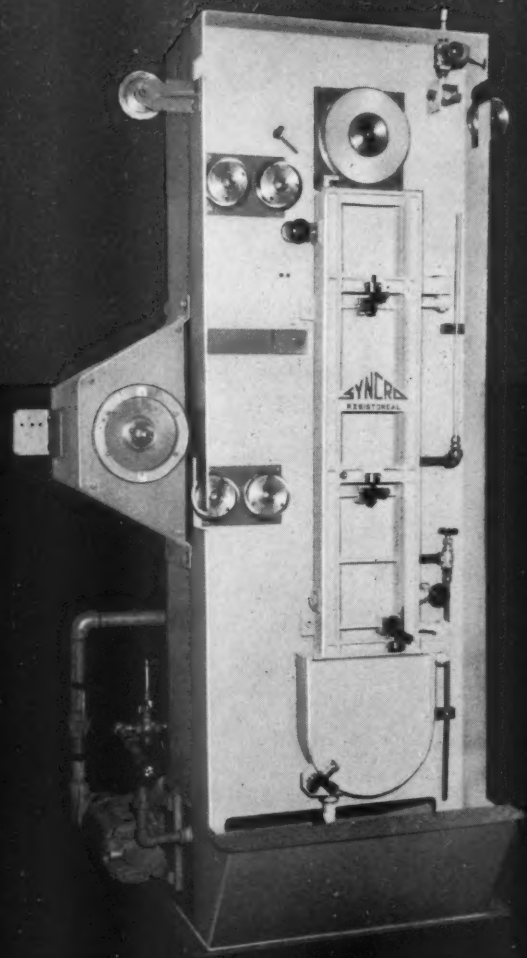
ILLUSTRATED HERE IS AN "R" LETOFF WITH
HOUSED-GEARED ADJUSTABLE MULTI-DISC SLIP-DRAG.

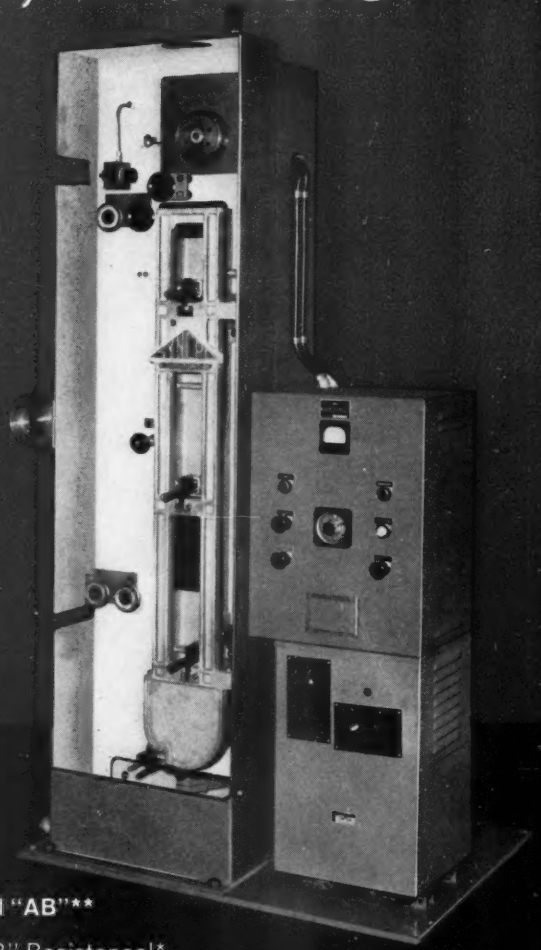
Our Design Aims: SAFETY — SIMPLICITY — PRODUCTIVITY

resistoneal*

annealing the modern way with ***SYNCRO***

Syncro models "AB" and "C" Resistoneal* (continuous electric resistance annealers operating in conjunction with Wire Drawing units) have been popular, both here and abroad, for many years. However, the 1961 models feature many design changes and improvements that warrant your investigation.





Model "AB"**

Model "AB" Resistoneal*
anneals fine size wire at maximum production rates.
The finished size range is from #26 to #36 B&S gauge copper.

Model "C"**

Model "C" Resistoneal* anneals intermediate size wire
at the highest possible speeds.
The finished size range is from #18 to #26 B&S gauge copper.

Only two machines, from Syncro's high-quality, complete line of wire drawing and cable mill equipment, are featured here. For further information write to: Syncro Machine Company, Perth Amboy, New Jersey.

**Redrawn tin and silver plated wire may be annealed through these machines.

*registered trademark

SYNCRO MACHINE COMPANY

affiliated company: Winget-Syncro Ltd., Rochester, Kent, England

Wire Drawing Machines • Stranders • Payoffs • Heavy-Duty Take-Ups • Capstans